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Novell gives Unix big shot in the arm

By Bob Brown
Senior Editor

Novell, Inc.'s proposed $350 million acquisition of AT&T's Unix System Laboratories, Inc. (USL) may prove a double victory for the company. It would not only give Novell control of a powerful 32-bit operating system as a server growth path for corporate customers, but hold hard-charging Microsoft Corp. at bay.

ANALYSIS

The proposed acquisition could make an already strong Novell even stronger as the company continues to enhance its flagship NetWare network operating system to meet user needs.

And the timing of the deal couldn't be worse for Microsoft, which is late to market with the 32-bit Windows NT operating system it will use in its assault on the server market ruled by Novell.

"This deal shows users that Novell is really committed to Unix and to shoring up NetWare while also throwing out a challenge to Microsoft," said John

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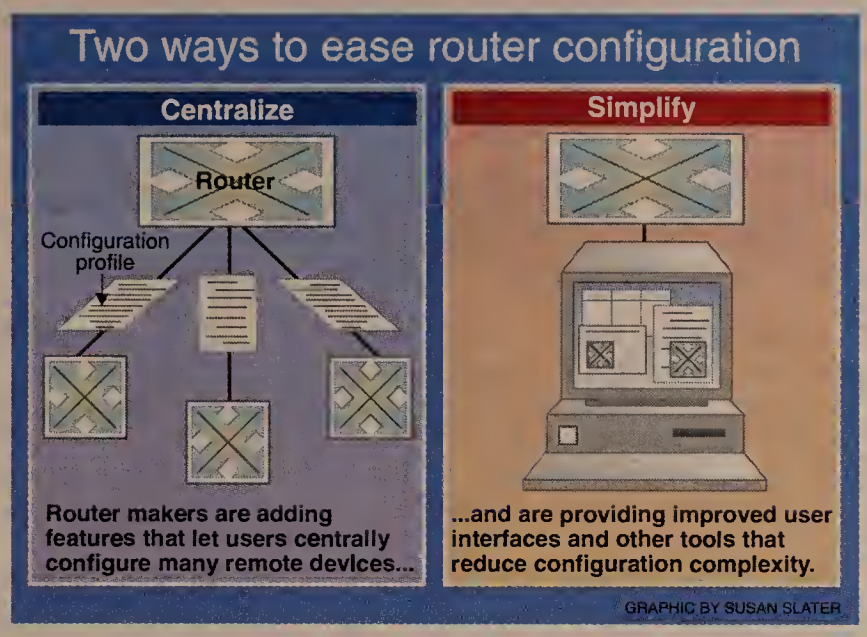

Users demand a simpler way to configure routers

By Maureen Molloy
Senior Writer

Deep within the inner sanctum of corporate America exists a rare breed of technicians who have mastered the black art of router configuration.

As users expand their LAN internetworks, they rely more and more on a handful of high priests who understand how to configure these key devices to ensure optimum net performance and reliability.

But while that arcane knowledge ensures a high level of job security, even router pros want vendors to make configuration easier. Tom Kadlec, vice-president of local-area network design and engineering at Citicorp in New York, said vendors have to come up with simpler configuration procedures, particularly for users with many remote sites that cannot afford to hire local internetworking experts.

"You cannot put a router in the hands of the uninitiated because it's not an easy device to configure," Kadlec said. "[People who] do not understand it will not get it to work, no matter how

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AT&T prepping user, carrier ATM switch

Bell Labs confirms development of switch that will support both public and private ATM networks.

By Bob Wallace
Senior Editor

MURRAY HILL, N.J. — AT&T Bell Laboratories last week confirmed it is working on an ATM switch intended to be employed in private user networks and by carriers to provision ATM-based services.

A prototype version of the Asynchronous Transfer Mode switch is being tested in an experimental high-speed nationwide network, and a commercial version could be out by the end of this year.

AT&T expects to use the switch to offer its own ATM-based services, although — unlike its competitors — it has been mum about its service rollout plans to date. Sprint Corp. has announced plans to offer ATM-based services this year to the Department of Energy, and MCI Communications Corp. already has cell relay switches in its network but does not yet offer ATM services.

"The main goal of our ATM [effort] is to explore the capabilities that high-speed networks bring to users and use the technology in services and products as soon as it is practical," said

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INSIDE

Users are turning to software tools that take the mystery out of network design. Page 34.

The latest Network World Security Test turns up only two workstation access control products that come close to meeting user expectations. Page 37.

DEC plans a Pathworks make-over

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. is expected to unveil later this year the next major release of its Pathworks network operating system offering improved performance and support for symmetric multiprocessing.

That announcement will follow a preview next week of a Pathworks enhancement that includes native support of the transport protocols in Novell, Inc.'s NetWare.

The Pathworks announcements are intended to strengthen DEC's position as a provider of desktop-to-enterprise networking solutions, an area that has been tough to crack for the minicomputer maker.

Although DEC is the most successful OEM reseller of Microsoft

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NETLINE

PAIR OF TERMINAL servers expected from 3Com. Page 2.

INTEL LAN ADAPTERS ease installation, maintenance for net administrators. Page 2.

3COM TO ACQUIRE Star-Tek in bid to widen token-ring expertise. Page 3.

MAGNALINK CLAIMS its local net bridge reaches new throughput plateau. Page 3.

ALLIANCE OF PRINTER vendors readying spec for printer management. Page 5.

EMERALD SYSTEMS preps low-cost tape backup system for NetWare LANs. Page 5.

VISISOFT GEARS UP for wider assault on management market. Page 16.

NEWSPAPER

Tough technology choices await users in year ahead

Network World Staff

Dizzy from the rapid pace of network technology last year? Better load up on aspirin and ice packs because 1993 looks downright frantic.

This year, network managers will be confronted with scores of promising new technologies and services that offer greater functionality and performance, such as Asynchronous Transfer Mode (ATM), Switched Multimegabit Data Service (SMDS), wireless communications and 100M bit/sec Ethernet.

Users will have to weigh the pros and cons of these new technologies and determine how to incorporate them into existing networks.

On the ATM front, 1993 promises to see a ground swell of activity from equipment vendors and carriers looking to capture a share of the nascent market.

For example, Cabletron Systems, Inc., which has teamed with ATM switch vendor Fore Systems, Inc., will unveil its first ATM products at NetWorld 93 Boston next week. SynOptics Communications, Inc. is fine-tuning its ATM switch, which is expected by the third quarter of 1993. Proteon, Inc. and Wellfleet Communications, Inc. are likewise prepping ATM interfaces for their bridge/router products, and a number of companies are developing ATM adapters for workstations.

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Two multiprotocol terminal servers on tap from 3Com

Firm's new Ethernet devices will simultaneously support TCP/IP, LAT, 3270 and OSI protocols.

By Skip MacAskill
Staff Writer

SANTA CLARA, Calif. — 3Com Corp. this week is expected to roll out two high-end Ethernet terminal servers that will allow users to run four protocols simultaneously.

The new stand-alone terminal servers, the diskless CS/3000 and the 2M-byte disk drive-based CS/3100, will support nearly five times as many users as 3Com's existing 10-port devices. They offer 48 RS-232 or RS-423 serial ports as well as a single parallel printer port and provide connection to a variety of hosts including IBM mainframes, Digital Equipment Corp. VAXes and Unix minicomputers.

Both models simultaneously support the Transmission Control Protocol/Internet Protocol, DEC's Local Area Transport (LAT), which 3Com licenses from DEC, TN3270 and Open Systems Interconnection protocols.

3Com claims it will be the first terminal server vendor to support OSI's International Standard Virtual Terminal Protocol. "The others only support a draft international standard. We'll also be the first to provide simultaneous

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IBM unit, EDS announce 10-year outsourcing deals

ISSC pact worth $3b; EDS to take in $500m.

By Joanne Cummings
Senior Writer

ST. LOUIS — Two large users rang in the New Year by announcing 10-year outsourcing deals that promise to help them ride out tough economic times and save on networking costs.

Last week, McDonnell Douglas Corp. signed an agreement with IBM's Integrated Systems Solutions Corp. (ISSC) worth $3 billion over the life of the contract. A week earlier, Bethlehem Steel Corp. announced a $500 million deal with Electronic Data Systems Corp. (EDS).

According to a spokesman for McDonnell Douglas, its outsourcing deal will reduce information systems (IS) expenditures significantly by leveraging ISSC's expertise and economies of scale. The pact should also help the aerospace firm to concentrate its resources on its core business at a time when it is facing mounting competition and cuts in defense spending.

"ISSC's experience and ability to implement technologies will help give us a competitive edge and enable us to focus on our core business functions," said Herbert Lanese, executive vice-president

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Intel card strengthens net mgmt. via flash memory

By Caryn Gillooly
Senior Editor

BOSTON — Intel Corp. next week is expected to introduce LAN adapters with built-in software that will help administrators manage networked PCs from a central location.

At NetWorld 93 Boston here, Intel is expected to bring out two new members of its EtherExpress LAN adapter family — the EtherExpress FlashC LAN Adapter with on-board Intel flash memory and the EtherExpress 16C LAN Adapter, which can be upgraded with flash memory.

In conjunction with the cards, Intel will introduce FlashWorks, a flash memory-based personal computer management utility set for the adapters.

The EtherExpress FlashC and 16C adapters are 8/16-bit Industry Standard Architecture cards that support thin, thick and 10Base-T Ethernet cabling.

The 16C adapter comes with a socket that accepts a 256K-byte Intel flash memory chip, while the FlashC adapter comes with the flash memory chip and the FlashWorks utilities.

Flash memory is Intel technology that basically blends random-

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Briefs

N.Y. Tel to offer fractional T-1. New York Telephone Co. will join a small group of local exchange carriers when it begins offering fractional T-1 services on Jan. 29. The company's Enterprise Fractional DS1 Service will be offered at speeds of 64K, 128K, 256K, 384K, 512K and 768K bit/sec. Pacific Bell and New England Telephone and Telegraph Co. are the other local carriers that offer fractional T-1.

MCI adds SONET links. MCI Communications Corp. last week said it has installed 20 Northern Telecom, Inc. S/DMS Synchronous Optical Network (SONET)-based fiber-optic transmission systems in its network. The systems, which operate at 2.4G bit/sec, are being used to support a 1,100-mile route from Atlanta to Cleveland to Albany, N.Y. MCI said a SONET route from Seattle to Portland, Ore., to Sacramento, Calif., will be brought on-line in the first quarter of 1993.

Frontier does MIME. Frontier Technologies Corp., based in Mequon, Wis., is expected to announce today an electronic mail enhancement that will enable Microsoft Corp. Windows users to exchange multimedia messages across Transmission Control Protocol/Internet Protocol networks. The firm's Super-TCP for Windows E-mail program will incorporate Multipurpose Internet Mail Extensions (MIME) that enable Windows users to send and receive spreadsheets, database files, graphics, audio and video across TCP/IP nets using the Simple Mail Transport Protocol. Super-TCP for Windows with full MIME extensions will be available later in January for $495.

Sprint names new executive team. Following shareholder approval of the merger between Centel Corp. and Sprint Corp., Sprint Chairman William Esrey has named the combined company's new management team. John Frazee, chairman and chief executive officer of Centel, has been named Sprint's president and chief operating officer (COO). Ron LeMay remains president and COO of Sprint's Long Distance Division. Stephen Vanderwoude, previously Centel's president, has been named president and COO of Sprint's Local Telecommunications Division, replacing the retiring Curtis Fields. Dennis Foster, currently vice-president of operations for Sprint's Local Telecommunications Division, has been named president and COO of Sprint's cellular company. All appointments will be effective when the merger is finalized, which is expected to take place early this year.

AT&T settles Tel-Save dispute. Tel-Save, Inc., a Philadelphia-based reseller of long-distance service, has settled its dispute with AT&T in which Tel-Save complained to the Federal Communications Commission that AT&T violated the Communications Act by denying its request for Tariff 12 services. The two parties resolved the dispute by negotiating a new discount contract, approved as AT&T Contract Tariff 54, under which Tel-Save will resell AT&T services.

SS7 gets clean bill of health. The Exchange Carrier Standards Association (ESCA) has released the final report assembled by its Internetwork Interoperability Test Plan Committee that last August conducted tests of Signaling System 7 communications between local exchange and interexchange carriers. The tests, prompted by SS7 malfunctions in local exchange carrier networks that caused major metropolitan outages in 1991, revealed no inherent network weaknesses, although the report noted the kind of congestion that led to the 1991 outages could not be recreated in a lab.

CONTACTS

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Back issues ($5 per issue) can be ordered from Bobbie Cruise by calling (800) 622-1108.

3Com bolsters token-ring line by acquiring intelligent hub vendor

By Maureen Molloy
Senior Writer

SANTA CLARA, Calif. — In an effort to bolster its presence in the token-ring hub market, 3Com Corp. has announced an agreement to acquire intelligent hub vendor Star-Tek, Inc. by the end of this month.

Eric Benhamou, 3Com's president and chief executive officer, said his company will buy the Northborough, Mass.-based Star-Tek in order to round out its token-ring technology and expertise.

"We currently have a good understanding of IBM connectivity at the [Advanced Peer-to-Peer Networking] and routing layer but felt we were at a disadvantage in our token-ring expertise at the hub level," Benhamou said. "Rather than develop that in-house, we decided to get that technology more quickly through Star-Tek."

3Com has agreed to purchase Star-Tek — which had 1992 estimated revenue of $20 million — for approximately $48.5 million. Star-Tek will initially retain its name and be referred to as a wholly owned subsidiary of 3Com, he added.

According to Anura Guruge, an independent strategic consultant in New Ipswich, N.H., the acquisition will provide

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Star-Tek: 3Com's next frontier

Company	3Com Corp.	Star-Tek, Inc.
Founded	1979	1987
Based	Santa Clara, Calif.	Northborough, Mass.
Employees	1,896	85
Annual revenue	$500 million	$20 million
Primary business	Wide range of internetworking products including intelligent hubs, multiprotocol bridge/routers and network interface cards	LAN connectivity products consisting of intelligent wiring hubs and network management software

Compression bridge sets new pace for field

By Skip MacAskill
Staff Writer

NORWOOD, Mass. — Magnalink Communications, a division of Telco Systems, Inc., this week will unveil a remote LAN bridge supporting data compression that the company claims will offer the highest known throughput for that category of devices.

The Series 4000HCB Ethernet/token-ring bridge, which supports source routing, comes equipped with one local-area network interface and either two or four wide-area network interfaces, including RS-449, RS-442, X.21 and V.35, at speeds between 4.8K and 2.048M bit/sec.

The compression bridge can compress data at T-1 speeds, delivering sustained throughput of 6M bit/sec over two T-1 links, which is nearly three times the throughput of similar devices on the market, according to Meir Yaniv, general manager of Magnalink.

The key to the increased throughput is Magnalink's proprietary data compression technology, which is in the form of two dedicated compression engines within the bridge. The functionality, which achieves data compression ratios of 2-to-1 and 4-to-1, is available on all WAN links supported by the bridge.

Cash in the pocket

According to Yaniv, the 4000HCB can support WAN links with combined speeds of 3M bit/sec and throughput rates between two and three times the WAN bandwidth.

"Our high-speed data compression technology allows users to obtain more throughput over existing lines, ultimately saving the cost of adding more or faster lines," he said.

By employing a 4000HCB, users can save as much as $3,000 a month for a typical 150-mile T-1 link and more than $15,000 a month for transcontinental connections, he added.

Other features include a redundant link for increased reliability, customization of traffic filtering and prioritization parameters as well as support for the Simple Network Management Protocol.

Available now, the 4000HCB with two WAN ports costs $11,900, while the four-port version is priced at $15,400.

NW Test Alliance organized to conduct real-world product testing

Network World has joined forces with some leading authorities on network technology to conduct joint product testing under the banner of the Network World Test Alliance. Members of the Test Alliance will undertake real-world tests of internetworking systems, network applications, security tools and other products and technologies that will be detailed in in-depth feature articles.

Members of the Test Alliance include Focus Software, Inc., Harvard University's Network Device Laboratory, the International Computer Security Association and TeleChoice, Inc.

Focus Software is a Salem, N.H.-based network integration and consulting services firm that evaluates and tests network software. Focus will test network-based applications, exploring interoperability issues in network environments. Focus tests will be conducted under the direction of Dr. Ugo Gagliardi, founder and president of Focus. The first Focus test under the Network World Test Alliance will examine electronic mail interoperability, and the results will appear in next week's issue.

Under the direction of Scott Bradner, consultant with Harvard University's Office of Information Technology in Cambridge, Mass., Harvard's Network Device Test Lab will work with *NW* on interoperability testing of internetwork equipment. Bradner is an authority on internetworking technologies and a recognized expert on testing of internetwork products.

The International Computer Security Association, based in Washington, D.C., is a forum for exchanging information on security issues and virus activity. Its mission is to help local-area network users improve the security of their information systems, reduce the threat of computer viruses and ensure the integrity of their data. Dr. David Stang, noted author as well as founder and research director of the organization, will oversee testing.

The International Computer Security Association's latest test appears in this issue (see "Who goes there?" page 37).

TeleChoice is a Montclair, N.J., consultancy specializing in strategic planning and analysis of intelligent nets, services and applications. Headed by Daniel Briere, president of Telechoice and a contributing editor to *NW*, the company will evaluate equipment and services used in voice and data nets.

NW gains access to the Internet

Readers may now contact *Network World's* editorial staff via the Internet.

The newspaper's Internet access is being provided by The World, a public information utility service offered by Brookline, Mass.-based Software Tool & Die. The World offers a variety of access options for personal computer and end users and provides entree to Internet services such as the Usenet information service, electronic mail and File Transport Protocol file sharing, as well as Telnet access to remote hosts.

NW may be reached at network@world.std.com. Editorial employees can be reached using the first initial of the person's first name, followed by up to seven letters of the last name and the string @world.std.com. For example, to reach John Dix, type jdix@world.std.com.

For more information about our Internet links, call us at (508) 875-6400. For information about The World, call (617) 739-0202.

Corrections: The story "Northrop deploys dual-homed FDDI net" (*NW*, Dec. 14) incorrectly identified the intelligent hub used in Northrop's net. It is a SynOptics Communications, Inc. LattisNet System 3000.

The Dec. 14 "Manager Minutes" briefs incorrectly reported the conference at which the International Communications Association (ICA) will present its Outstanding Student of the Year Award. It will be presented at the ICA ComNet Dallas '93 conference to be held May 16-21.

Multivendor printer management spec to make debut at NetWorld

By Jim Duffy
Senior Editor

BOSTON — At NetWorld 93 Boston next week, the Network Printing Alliance (NPA), a coalition of network printing companies, will unveil a protocol specification designed to make it easier for users to get management information from printers across a network.

The protocol is intended to establish a standardized messaging format between printers and PCs or print servers that control network printing.

Using the protocol, the PC or print server can deliver information on printer configuration, print job status, the type of fonts installed and available memory, NPA said.

"The biggest need [for the protocol] will be to get status information back" from printers, said Curtis Tirrell, product marketing manager at Intel Corp., one of the NPA's founding companies.

Today, users are notified that printers are off-line or out of paper when their print jobs are interrupted. The NPA protocol will keep users notified in real time of print status conditions, such as whether a color cartridge needs replacing and how much paper and toner was used for previous jobs, Tirrell said.

The protocol would support all printing devices on the network, regardless of manufacturer, NPA said. The protocol is independent of page description language, printer technology and communication interface between devices, the organization said.

Such a protocol does not exist today, NPA said.

The specification contains guidelines for software developers and printer manufacturers that want to implement the protocol in their products. NPA will continue to refine the protocol and compliant products should emerge this year, the organization said.

The NPA was founded in April 1991 by four companies, including Intel. It now includes more than 50 companies.

Emerald preps low-cost backup tool for NetWare

By Joanne Cummings
Senior Writer

BOSTON — Emerald Systems is expected to announce at the upcoming NetWorld 93 show here a new low-priced 4.4G-byte 8mm tape drive and software designed for automating backups of Novell, Inc. NetWare local-area networks.

The new backup package, called the Accelerator, is the first of several bundled hardware and software packages that Emerald plans to introduce this year. It is priced at $4,995, which is $3,000 less than comparable solutions from other vendors, according to the company.

Accelerator comprises Emerald's Xpress Librarian 2.0 Windows-based backup management software and a tape drive that features hardware-based data compression for better speed and reliability.

The Xpress Librarian 2.0 software runs on an 80286- or 80386-based workstation. It enables LAN administrators to perform backup, restoral and data storage management functions via Windows-based point-and-click commands.

In addition, the software supports NetWare 2.15 and higher and DOS 3.3, and it runs under Windows 3.0 and 3.1. After Jan. 14, it will also support Windows for Workgroups, Emerald said.

The software lets administrators schedule automatic backups and file archives, as well as conduct disk grooming and create server disk usage reports at regular intervals in unattended mode. It offers an automated logon and logout capability, which ensures that security is preserved during unattended backups, according to the company.

In addition, the package features a Quick File Access feature that enables most stored files to be recovered in as little as two minutes, the firm said. As part of that feature, when a file is requested, the software directs the user to the exact location of every version of that file, even if it resides on different tapes.

The Accelerator will be available after the NetWorld show.

Tough choices await users

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However, there has been a flurry of activity by several vendors to develop less expensive alternatives to ATM.

Vendors such as 3Com Corp., Hewlett-Packard Co., Grand Junction Networks, Inc. and SynOptics are driving the 100M bit/sec Ethernet technology, which will be able to handle a variety of multimedia applications — also one of the forces behind ATM. A standard for Fiber Distributed Data Interface over copper is also expected to be finalized this year.

Most analysts believe ATM will be the big winner of these technologies, although 100M bit/sec Ethernet will have a significant niche following. FDDI and proprietary schemes are expected to lose ground.

On a more traditional front, IBM will hurdle the last obstacle toward achieving true peer-to-peer communications within its Systems Network Architecture. IBM is expected to ship in the first quarter of 1993 VTAM 4.1 with Advanced Peer-to-Peer Networking (APPN) support.

That could be the boost APPN needs to catch on.

According to David Passmore, vice-president of Gartner Group, Inc., a consultancy in Stamford, Conn., the APPN VTAM announcement is indeed the biggest communications move IBM has made in 10 years.

Distributed network and systems management will get a boost this year as both the Open Software Foundation, Inc. (OSF) and Novell, Inc. release new management code.

In December, OSF plans to issue the first release of its Distributed Management Environment (DME) framework, which will include the OSF DME user interface, management objects and developers' tool kit. Users should begin seeing DME-compliant applications in early 1994.

Novell's Unix Systems Laboratories, Inc. unit, meanwhile, plans to release its distributed management framework in the first half of this year. Like the OSF's DME, the Novell framework will be built on object-oriented technology and will support applications for network management, print services and management, and data backup, archival and restoral.

> Most analysts believe ATM will be the big winner of these technologies.
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Transmission options

On the carrier front, the coming year will be one of tough decisions for vendors and users alike.

Carriers will have to decide which of several high-speed services to bank on, choosing from such options as ATM, SMDS, frame relay and Integrated Services Digital Network.

Interexchange carriers will continue to offer frame relay and SMDS while they build the network infrastructure to support high-speed ATM services.

It's a safe bet that many users will migrate from private nets or hybrids back to the public network once ATM services become available. The Big Three are prepared to offer ATM services later this year or in early 1994.

Local carriers, which have said little about ATM, will push for either frame relay or SMDS, opting to focus on one and offer the other only where demand dictates.

The ascent of ATM, SMDS or frame relay could spell the end for ISDN, which has yet to gain critical mass and will continue to be offered almost entirely under customer-specific arrangements instead of general tariffs.

Wireless messaging will begin to take off in 1993 as traveling businesspeople see the benefits of untethered communications.

Look for RAM Mobile Data, which operates a nationwide packet radio network, to forge relationships with Microsoft Corp. and Apple Computer, Inc., as well as myriad E-mail gateway and service providers.

Wireless messaging will also be fueled by a wave of powerful new notebook and pocket-sized portable computers, such as Apple's Newton personal digital assistant. Chip makers will come out with radio packet modem cards and dual land-line and cellular modems that will be integrated with portable computers.

The advent of small, portable devices with built-in wireless and land-line communications will be too tempting for traveling professionals to resist.

It's clear the market for networking technology will continue to move at record speeds in 1993. Established vendors will have to race to maintain dominant positions in these new technology venues, and users will require foresight to ascertain which vendors and technologies will survive and which will fade away.

A parting glance: 1992 in review

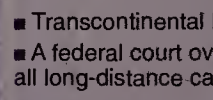
January
- FCC proposes microwave users vacate spectrum to make way for emerging wireless personal communications services.
- AT&T announces the Definity Generic 3 PBX.

February
- Novell, Inc. unveils the NetWare Management System, which lets users centrally manage NetWare and other LANs.

March
- Microsoft Corp. introduces Windows Open Services Architecture strategy for linking Windows-based PCs to enterprisewide services.
- Apple Computer, Inc. adds multiprotocol support to its Macintosh with the announcement of System 7.
- IBM announces Advanced Peer-to-Peer Networking (APPN) support for its mainframes.

April
- Flood in downtown Chicago tests companies' disaster recovery plans.
- IBM pulls the plug on OfficeVision/2, choosing to market Lotus Development Corp.'s Notes and cc:Mail instead.
- Nine cellular carriers pledge support for IBM's CelluPlan II, a packet technology for transmitting data across cellular nets.
- Sprint Corp. becomes the first carrier to announce a toll fraud monitoring service.

June
- Sprint and Centel Corp. announce plans to merge with $2.85 billion stock swap.



William McGowan

- William McGowan, MCI Communications Corp.'s founder and chairman, dies at the age of 64.
- Banyan Systems, Inc. unbundles services from its VINES network operating system and offers them as add-ons to NetWare and other LAN systems.
- Oracle Corp. unveils Version 7 of its database, which supports two-phase commit, location transparency, and stored procedures and triggers.
- Authors of SNMP offer new version of the management standard, called Simple Management Protocol.

July
- Adaptive Corp. unveils an Asynchronous Transfer Mode switch.
- The FCC, led by chairman Alfred Sikes, allows RBHCs to carry, but not originate, video programs.

Alfred Sikes

August
- IBM and Sears, Roebuck and Co. consolidate their value-added networks in a joint venture called Advantis.
- Hurricane Andrew wreaks havoc on southern Florida and Louisiana, disrupting computer and network operations.
- AT&T proposes a major pricing overhaul for its entire suite of private-line services.

September
- Cisco Systems, Inc. outlines alternative to IBM's APPN called Advanced Peer-to-Peer Internetworking.
- FCC opens up local loop to competition and overhauls local access service rates.

October
- Grand Junction Networks, Inc. offers 100M bit/sec Ethernet.

November
- MCI becomes first long-haul carrier to announce a Switched Multimegabit Data Service offering.
- AT&T announces intentions to buy a 33% stake in McCaw Cellular Communications, Inc.
- Transcontinental ISDN Project '92 gets under way.
- A federal court overturns long-standing FCC rules and requires all long-distance carriers to file tariffs, not just AT&T.

December
- Novell announces plans to buy Unix System Laboratories, Inc. for $350 million.

GRAPHIC BY SUSAN SLATER

AT&T readies ATM switch

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Charles Kalmanek, supervisor of Bell Labs' computer network research group.

Kalmanek would not say when AT&T would announce ATM offerings.

However, Erik Grimmelmann, marketing director for AT&T's Internet/National Research and Education Network unit, said one objective of the test-bed effort is to develop equipment and service offerings. "We're moving forward aggressively with ATM and expect 1993 to be a very exciting year," he said.

ATM technology is based on 53-byte cells that can support any kind of traffic mix — including voice, data and video — on both local- and wide-area networks.

Analysts said 1993 could be a big year for AT&T if the carrier delivers its ATM switch in a timely manner.

"Users realize that ATM is the future of network services and are waiting to migrate from private nets to the public network," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. "Whichever carrier is the most flexible in its offerings will be the one that wins all the big user contracts."

With this in mind, Bell Labs began working over two years ago to build the new ATM switch.

The experimental switch is based loosely on AT&T's Datakit Virtual Circuit Switch (VCS) but uses a 600M bit/sec bus in place of the system's existing 8M bit/sec one. The ATM bus could be upgraded to operate at 1G bit/sec, although Kalmanek sees no near-term need for such high speeds.

AT&T would not say if current Datakit VCS users could migrate to the new ATM switch.

The ATM switch supports two types of specially developed full-duplex line cards. One card can support eight local 200M bit/sec fiber trunks for configuring the switch as a local-area ATM hub on the user premise. The other can support eight 45M bit/sec T-3 wide-area links.

"We decided to go with line cards that supported T-3s first and will support other transmission speeds later," Kalmanek said. "That would not prohibit us from developing cards that would support [Synchronous Optical Network] transmission speeds as needed."

The experimental switch can house eight cards of either kind, but Kalmanek said it could be expanded to house as many as 32.

According to Bell Labs, the switch could be equipped with software that supports partitioning, the ability to divide a single physical network into multiple logical networks. This would help carriers offer virtual private nets to users and would let users divide their networks by region, application or other criteria.

"We definitely see the experimental switch evolving to support this important [function]," Kalmanek said.

In selling its new switch to other carriers, AT&T can expect competition from vendors such as TRW, Inc., which will provide ATM switches to Sprint, and Siemens Stromberg-Carlson, which supplies MCI with cell switches.

There will be considerably more competition on the user side. "Most of the world has, or plans to have, an [on-premises] ATM switch," said Steve Taylor, president of Distributed Networking Associates, a Greensboro, N.C., consultancy.

AT&T's prototype ATM switch serves as the platform for the Experimental University Network, an eight-node T-3 backbone net built by AT&T to help the carrier as well as several universities and research organizations learn about ATM.

The test-bed network so far has been used for multimedia videoconferencing, although experiments in high-speed LAN interconnection and remote access to supercomputers are planned.

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

"Broadband ISDN is the Holy Grail of data communications."

James Leighton
Manager of networking and distributed computing
National Energy Research Supercomputing Center
Lawrence Livermore National Laboratory
Livermore, Calif.

Users manage with standards

Standard	Percentage currently use	Percentage plan to use
Open Software Foundation, Inc.'s Distributed Management Environment	4	8
IBM's SystemView	13	7
Government Network Management Profile	1	2
OSI management (CMIP, CMOT, CMOL protocols)	6	11
SNMP	40	20
None	22	11
Other	46	3

The most frequently used products for network management are those based on the SNMP standard, according to a survey of 2,500 network managers at companies with annual revenues exceeding $100 million.

GRAPHIC BY SUSAN SLATER SOURCE: DATAPRO INFORMATION SERVICES GROUP, DELRAN, N.J.

Data Packets

Harris Adacom Network Services, Inc. of Carrollton, Texas, has announced the new Hawk line of 3270 terminals designed to support both SNA and TCP/IP protocols.

Hawk terminals reside on Ethernet-based local-area networks and can connect to a Systems Network Architecture mainframe over Transmission Control Protocol/Internet Protocol nets by emulating tn3270 terminals or, when used with Harris' Internetwork Controller System, through direct 3270 emulation. The Hawk also supports simultaneous Virtual Terminal emulation for access to Digital Equipment Corp. VAXes or other Unix-based hosts.

In its base configuration, users can have as many as four 3270 sessions with the mainframe or divide those sessions between the IBM mainframe and a VAX host. Users can cut and paste between those sessions, as well. Later versions of the Hawk will support 100 sessions, the company said.

Hawk terminals will be available in March starting at $1,495.

Sync Research, Inc. of Irvine, Calif., and **Cascade Communications Corp.** of Westford, Mass., last week said they have completed interoperability testing, including Systems Network Architec-

(continued on page 10)

X.400 over standard phone wire may be reality in '93

APS standard to provide worldwide connections.

By Michael Cooney
Senior Editor

LOS ANGELES — By March, an eclectic group of international vendors hopes to have settled on a communications standard that supports the transmission of multimedia X.400 traffic over dial-up telephone lines.

The Asynchronous Protocol Specification (APS) would let users transfer X.400-based traffic — including electronic data interchange, electronic mail, voice, images and facsimile — over the existing worldwide dial-up phone net. Today's X.400 implementations typically require a leased or dial-up X.25 connection.

"We've seen a lot of demand for X.400 over telephone wire, but no standard exists."

▲▲▲

Leading the development of APS are Isocor, Norwegian Telecommunications Administration, Apple Computer, Inc., Microsoft Corp., Soft-Switch, Inc., Tandem Computers, Inc., Digital Equipment Corp., Hewlett-Packard Co. and Pacific Bell, plus 17 other firms. Large user companies have also been involved.

"We've seen a lot of user demand for running X.400 over regular telephone wire, but no standard exists today that tells them how to do it, and we want to change that," said David Knight, chairman of the APS alliance and vice-president of Isocor, a messaging software developer.

The standard would be useful for firms that have many remote personal computer users who could employ APS-compliant X.400 applications to dial into their local-area nets, Knight said. The standard would also let users send E-mail to Europe without a leased line or dial-up X.25 line.

In the U.S., the standard could be particularly significant because leased X.25 services can sometimes take almost five months to set up. Also, leased lines are expensive, he noted.

"We want to create one big public backbone where all the user needs to know is the address of the recipient," Knight said.

The APS alliance group is currently wrestling with two major concerns: how the X.400 APS standard could be routed over mixed Open Systems Interconnection and Transmission Control Protocol/Internet Protocol nets and how to support both low and very high speed modems.

"We are working on these two issues now because they must be considered in the design if APS is to be successful," Knight said.

The APS vendors want to deliver a final draft of the APS standard to the March meeting of the Consultative Committee on International Telephony and Telegraphy. If adopted, products supporting the standard could appear by the end of the year.

User runs into snags linking AIX, SNA

User switches to SNA-linked RS/6000 to access mainframe data but finds outages a problem.

By Michael Cooney
Senior Editor

DENVER — Users at Oppenheimer Management Corp.'s service division got far less than they bargained for when they linked their AIX-based RS/6000 to their Systems Network Architecture network.

A little over a year ago, the firm swapped out its Series/1 processor for a RISC System/6000 to act as its voice response hub capable of accessing data on its mainframe.

Since then, anytime the host, a CICS region on the host, the front-end processor or almost anything else fails, the SNA link between the RS/6000 and the mainframe is lost and must be manually reset and redefined.

Because the RS/6000 handles 60,000 to 70,000 calls per month, the outages are a major problem.

Steve MacGregor, assistant vice-president of voice/data communications for Oppenheimer, detailed his problem on the Reader Advocacy Force (RAF) Forum of *Network World's* Bulletin Board System. (For instructions on how to use the BBS, see page 2).

NETWORK WORLD'S R.A.F. READER ADVOCACY FORCE

The RS/6000 runs IBM's AIX SNA Services/6000 and AIX Host Connection Program/6000 packages, which together let the RS/6000 use SNA protocols to communicate with the mainframe, according to MacGregor.

System reconnection

MacGregor said he thinks the software should be able to bring the link back up on its own in a reasonable amount of time.

IBM agrees.

According to Laura Knapp, se-

(continued on page 10)

Firm's business depends on thriving AS/400 mart

By Jim Duffy
Senior Editor

ROCHESTER, Minn. — In the town where IBM develops one of its more successful products, the Application System/400 minicomputer, is a software company whose livelihood is staked on the AS/400's viability in client/server environments.

That company is Rochester Software Connection, Inc. (RSC), a maker of desktop-to-AS/400 products that are designed to ensure that the IBM minicomputer becomes and remains a fixture in client/server networks.

It is with this objective that RSC recently outlined a new product intended to link another wildly popular platform, Microsoft Corp. Windows workstations, to AS/400 minicomputers.

The product is called ShowCase ODBC. ShowCase ODBC, which RSC claims is the first of its kind for the AS/400 environment, supports Microsoft's Open Database Connectivity application program interface, which allows applications to access a range of multivendor databases.

"We are claiming the desktop-to-AS/400 connectivity business," said Marc Shinbrood, president and chief executive officer of RSC.

According to Shinbrood, RSC can make that claim because others in the personal computer-to-AS/400 market, such as Digital Communications Associates, Inc., Attachmate Corp. and Wall Data Corp., provide terminal emulation. RSC is only in the client/server business, he says.

ShowCase ODBC resides on Windows clients and AS/400

(continued on page 10)

THE COMPAQ PROSIGNIA PC S
THE SAME IMPACT AS OUR R

Not long ago, we introduced PCs that established us as the new leader in affordable computing. To that we now add the COMPAQ ProSignia Family of PC Servers: delivering a new level of performance, affordability and support by establishing a new class of PC servers.

Ironically, the more critical your PC network becomes, the more likely your network server will prove inadequate.

The faster you need something, the slower it delivers. When it's time to upgrade or expand, you find yourself at the technological equivalent of a dead-end street.

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What you need is an easy-to-manage system offering high performance, flexibility and extended support. All at an exceptional price.

In other words, a breakthrough.

In still other words, the new COMPAQ ProSignia.

PROCESSORS: *chip upgradable 486/33 or 486DX2/66* **EXPANSION:** *7 32-Bit EISA bus master slots* **STORAGE:** *over 6GB internal in 8 bays* **HARD DRIVES:** *Fast-SCSI-2 (330MB, 550MB, 1.05GB), Drive Array Pairs (680MB, 1.02GB), IDE (210MB, 340MB, 510MB)* **DRIVE CONTROLLER:** *Integrated or optional 32-Bit Fast-SCSI-2, IDA-2, or Integrated IDE (on models 1/EL and 340/W)* **NETWORK CONTROLLER:** *Preinstalled 32-Bit NetFlex Controller* **SERVER MANAGEMENT:** *INSIGHT Server Management Framework* **RAM:** *4-128MB of industry-standard SIMMS* **WARRANTY:** *Free three-year, parts and labor, on-site** warranty* **SUPPORT:** *Free 24-hour, 7-day hardware support, optional multi-vendor network operating system support.*

For starters, the COMPAQ ProSignia 486/33 outperforms comparably configured IBM and Dell servers by 83% and 64%, respectively.* (Both of which, by the way, are much more expensive.)

In not-so-simple terms, here's how we did it:

COMPAQ ProSignia disk-configured models come standard with an all-new 32-Bit Fast-SCSI-2 Controller that performs twice as fast as old SCSI technology. As well as a preinstalled, COMPAQ 32-Bit NetFlex Controller that works with Ethernet or Token Ring. And for those who require truly

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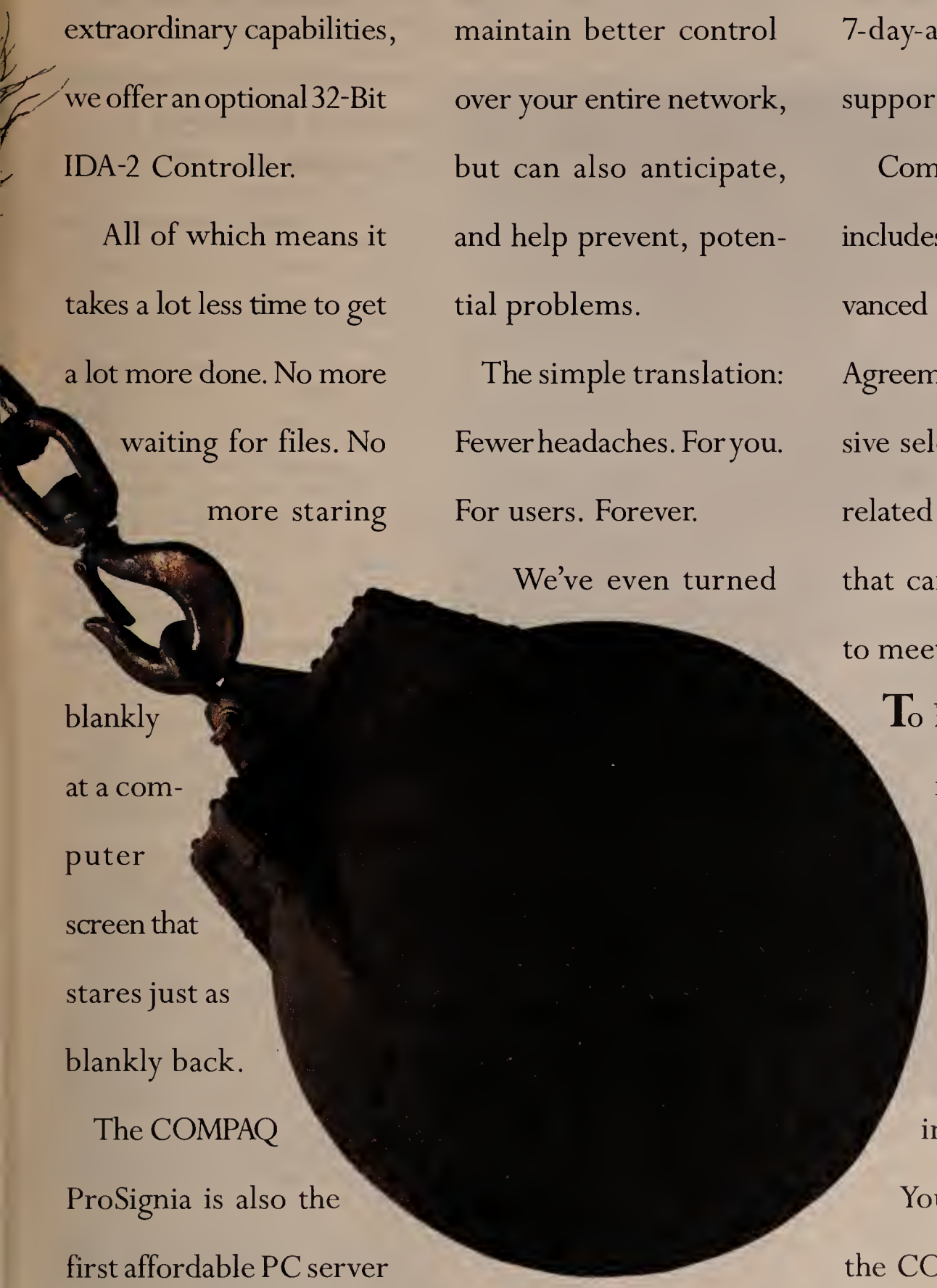

extraordinary capabilities, we offer an optional 32-Bit IDA-2 Controller.

All of which means it takes a lot less time to get a lot more done. No more waiting for files. No more staring blankly at a computer screen that stares just as blankly back.

The COMPAQ ProSignia is also the first affordable PC server incorporating advanced management technologies. Included is a set of simple-to-use features that not only help you maintain better control over your entire network, but can also anticipate, and help prevent, potential problems.

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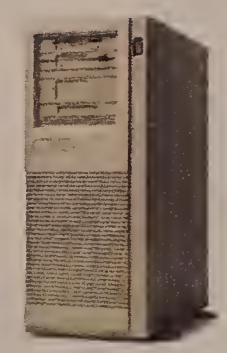
You'll find out why the COMPAQ ProSignia represents such an exceptional value. And why it will undoubtedly make a big impression. On the marketplace, and on you.



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intel inside

With only industry-standard technologies and an easy-to-upgrade processor path, the COMPAQ ProSignia provides a cost-effective way to meet today's needs today. And tomorrow's tomorrow.

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by Contracted Service Providers, is specific to hardware products and may not be available in certain geographic locations. Consult the Compaq Customer Support Center for details. †Suggested retail price; reseller price may vary; price indicated is for non-disk-configured COMPAQ ProSignia 486/33 Model 1/EL, not pictured here; monitor, NetFlex Controller not included. Models including hard drive and NetFlex Controller start under $4500. The Intel Inside logo is a registered trademark of Intel Corporation.

User runs into snags linking AIX, SNA

continued from page 7

nior advisor for IBM's local-area network technical marketing group, the software will usually reconnect the system with the network within a time period defined by the user.

'Undetermined glitch'

"Oppenheimer has some sort of undetermined glitch in its software that is slowing down that response time," Knapp said. "This is a localized problem at Oppenheimer that we are working to correct and not a widespread problem with the AIX SNA service software."

Another IBM spokesman said a solution is on the horizon for Oppenheimer but did not disclose its details. He did say there were "quite a number of folks working on it."

MacGregor said the solution won't be available soon enough.

"In the past, the Series/1 always kept the line to the mainframe open, or at least it kept retrying until everything was working properly," MacGregor said. "We expected the same thing from the RS/6000."

IBM labeled the problem a "critical situation" in September, he said, a designation that is supposed to bring out IBM emergency relief troops but did not in this case.

Pretty tiring

"IBM has issued us a number of different fixes for the software, but none of them has brought our systems up to where it was with the Series/1," MacGregor said.

"IBM's SNA people say it's the AIX people's problem, and the AIX people say it's the SNA developers' problem; it gets pretty tiring," he said.

MacGregor said he has put off any future purchases of IBM equipment until the problem is fixed.

"We are a Blue shop, and it seems incredible that this problem could go on for so long," he said. "It's like you're driving a Ferrari, and every time you stop at a stop light, somebody has to put air in your tires."

Firm's business depends on AS/400

continued from page 7

servers in a network. It generates database calls from a Windows application to a ShowCase ODBC-complaint database, which is, in this case, an AS/400.

ShowCase ODBC uses an IBM Advanced Program-to-Program Communications facility, such as IBM's AS/400 PC Support or Systems Network Architecture gateways from Novell, Inc. and DCA, to route the database calls from the Windows client application to the AS/400. The AS/400 data is then downloaded to and processed at the Windows client, a method consistent with the client/server computing paradigm, RSC said.

ShowCase ODBC costs $495 per user and will be available in the first quarter.

Data Packets

continued from page 7

ture connectivity, between Cascade's STDX frame relay switch and Sync Research's frame relay assembler/disassemblers (FRAD).

By certifying interoperability between their products, Sync Research and Cascade are positioning their offerings as components of a frame relay network in which local-area network and SNA traffic are consolidated over a single backbone.

Sync's FRADs connect IBM SNA/Synchronous Data Link Control controllers to frame relay networks. They convert the SDLC protocol to IBM's Qualified Logical Link Control protocol for transmission across the wide-area network.

Cascade's STDX is a backbone switch capable of forwarding 24K 64-byte packet/sec.

Digital Communications Associates, Inc. announced it will support Digital Equipment Corp.'s DECnet/SNA Gateway Access Interface (GAI), which gives Windows workstations on Pathworks LANs access to IBM hosts through DEC gateways.

DCA will incorporate GAI in its Irmalan for Windows Client 3270 terminal-emulation software. That product will be released at the same time as the next major release of DEC's Pathworks for Windows software.

DCA is currently shipping Irmalan for Windows Client software that supports DEC's Gateway NETBIOS Interface (GNI). GNI is specific to the DCA product, while GAI can work with non-DCA emulators, a DCA official said.

Worth Noting

By 1998, LANs will account for 16% of the total fiber-optic revenue worldwide, compared to 1991 figures of 10%, according to Market Intelligence Research Corp. of Mountain View, Calif.

Netnotes

Legato Systems, Inc. announced it has licensed Novell, Inc.'s Runtime for NetWare 3.11.

Under the agreement, Legato will bundle Novell's Runtime with its NetWorker backup and recovery software, enabling users to utilize the package to provide backup and recovery services for NetWare networks on a dedicated server. Prior to the agreement, Legato sold NetWorker as an application that ran on top of NetWare on a NetWare file server.

According to the firm, the dedicated version will provide several benefits, including the ability to run maintenance on the dedicated backup server without affecting other NetWare services and the ability to tailor the backup server to specific needs without worrying about conflicting NetWare Loadable Modules.

Legato's Networker Dedicated Server Option for NetWare Runtime is available and ranges in price from $1,350 to support two servers and 10 clients, to $8,300 for 26 servers and 500 clients. Networker will still be available separately, with pricing ranging from $750 to $7,495, depending on the number of servers and clients supported.

IBM's Personal Software Products is making its 32-bit OS/2 Version 2.1 network operating system avail-

(continued on page 12)

Mac-based software keeps eye on multiprotocol nets

Caravelle to release new version of NetWorks.

By Joanne Cummings
Senior Writer

SAN FRANCISCO — Caravelle Networks Corp. is expected to announce at this week's MacWorld Expo here a new version of its Macintosh-based software that enables LAN administrators to monitor a variety of devices on a multiprotocol net.

NetWorks 3.0, like the previous version, is software that runs on a net-attached Macintosh and monitors devices on AppleTalk and Transmission Control Protocol/Internet Protocol networks. The new version also now monitors devices on Novell, Inc. Internetwork Packet Exchange (IPX) and Digital Equipment Corp. DECnet networks, as well as devices that support the Simple Network Management Protocol.

At user-defined intervals, the software searches for and monitors all net-attached devices, including bridges, gateways and routers. When it detects a device failure, it notifies net administrators via electronic mail or pager. The software also monitors Apple Computer, Inc. LaserWriter printer status and free disk space on servers, and performs AppleTalk device-specific tests. It then informs administrators when preset parameters are exceeded.

Version 3.0 can monitor any IPX device or service, including file servers, user groups, print servers and print queues. It utilizes Novell's MacIPX to locate and monitor all active devices on any Novell IPX-based Ethernet local-area network.

For monitoring devices using SNMP, the product comes with support for Management Information Base (MIB) I along with a MIB editor that lets users add support for custom or private MIBs.

Version 3.0 also monitors DECnet devices by communicating through DECnet routers, enabling it to check VAXes, VAXstations and VAXservers, as well as notify administrators of any node failure.

Other new features with Ver-

(continued on page 12)

LAN tool offers protocol analysis, cable scanning

By Caryn Gillooly
Senior Editor

EVERETT, Wash. — John Fluke Manufacturing Company, Inc. this week is expected to bring out what the company says is a new category of LAN diagnostic tool, which combines the most common troubleshooting capabilities of protocol analyzers and cable scanners with its own unique set of features.

The product, dubbed the 670, is a hand-held device that lets administrators troubleshoot token-ring nets by isolating faults on a wire, on adapter cards and within media access units. Like a cable scanner, the product can locate shorts, splits or other problems on the cable, as well as test network interface cards (NIC) and test and reset multistation access unit (MAU) ports.

But like a protocol analyzer, the 670 can also collect detailed packet frame information, provide software error analysis, track network utilization and test network response times. The unit can indicate critical health parameters and can perform statistical monitoring and diagnostic measurements.

According to Fluke, based here, the 670 lets the administrator print and save historical data, and has a benchmark feature so that even novices can measure their network productivity.

The 670 also provides capabilities not included in either cable testers or protocol analyzers, such as its Lobe Test feature. When the 670 is connected between a ring station and the MAU, the Lobe Test feature lets it determine if a fault is present in the NIC, the cable or the MAU.

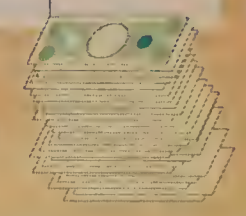
The 670 is available now for token-ring networks at a price of $5,995. The company said it plans to offer a similar Ethernet version of the product as well as a combination Ethernet/token-ring version.

Good help doesn't come cheap

Typical annual LAN support costs for a 5,000-user net

Support type	Number of support staff	Cost per support person	Annual budget	Ratio of support/ users	Support cost per user
LAN administration	67	$56K	$3.8M	1/75	$750
Help desk	8	$64K	$510K	1/625	$100
Physical LAN support	19	$74K	$1.4M	1/260	$280

Annual LAN support charges of a typical 5,000-user net represent about 89% of the total network support costs.



GRAPHIC BY TERRI MITCHELL

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

User firms plagued by LAN money pits

Forrester study finds cost of local net support eating up corporate cash but offers tips for relief.

By Caryn Gillooly
Senior Editor

As more users shift applications off mainframes and onto LANs, they are finding out the hard way that supporting these LANs can be a drain on the network budget.

MIS departments typically spend about $6.4 million a year supporting the average 5,000-user corporate network, a number equivalent to about $1,270 per user, according to a recent study by Forrester Research, Inc. The problem is, the majority of these costs are attributable to local-area network administration.

"On average, $750 of the $1,270 support tab is eaten up in departmental LAN administration — routine tasks such as restarting hung printer queues, rebooting frozen users and rearranging disk space," according to Forrester's study, titled The LAN Money Pit.

But there is hope. According to Forrester, there is a way to ease the LAN financial burden by streamlining both the network itself and the network staff.

Forrester points to several reasons for today's high LAN administration costs. First, a majority of the LANs in use are Novell, Inc. NetWare LANs, which are desiged to be managed one server at a time. Therefore, in some companies, each department — no matter how small — may have its own administrator.

Novell has said it will ease some of the administration burden with the new directory services promised in NetWare 4.0. With a networkwide directory service, administrators will be able to alter configurations or add users to any server on the network from a central point.

Today, if a user needs to be added to the network, the information must literally be entered into each individual server throughout the enterprise net.

Another primary reason LAN costs are so high is because of un-

> In some companies, each department may have its own administrator.
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trained network administrators who have not yet found respect within the corporate infrastructure.

"Administrators are often self-taught," the study said. As departmental networks have sprouted up throughout corporations, usually the most PC-literate person is designated the network administrator.

These administrators are funded by their own departments — therefore, generally underpaid — and are often adrift with-

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Users plagued by LAN money pits

continued from page 11

in large companies, although their interests and career paths are more in line with that of corporate MIS.

"We're having a problem providing consistent and efficient day-to-day support," said a representative from a commercial bank interviewed for the report. "Administrators need better training and tools. They're also way underpaid. We need to fix salaries and offer proper incentives."

Other users agreed. "Our LANs were set up randomly depending on what business areas needed," said one pharmaceutical company representative. "As a result, network administration is inefficient and disorganized."

And the answer is . . .

The solution to the problem is certainly not to move back to mainframe-based computing. However, Forrester does recommend eliminating the number of individually run departments.

"Move toward superservers. It is cheaper to support one server with 200 users than it is to support 10 LANs of 20 users each," the study said. "The benefits of this are fewer LAN administrators, each of higher quality. Rather than having 10 clueless departmental helpers for 200 users, MIS can assign one well-equipped person with tools to do the job."

With the move to superservers, Forrester recommends that companies cut administrative personnel and fold the administrative and help desk duties together. These "new" administrators will be able to deal with users' network problems as well as perform administrative tasks.

For those customers that have already moved to this setup, it has worked well.

"One thing that's helping keep the head count so low and network availability so high is LAN consolidation," said a representative from a computer company who was interviewed for the Forrester study. "We no longer have small servers everywhere. Instead, we've got fewer, more powerful and more reliable machines."

By implementing these steps, in addition to others recommended in the study, Forrester estimates companies could gain savings of as much as 20% on the 5,000-user network that today costs $6.4 million to support.

Netnotes

continued from page 11

able for beta testing to more than 5,000 users, independent software vendors and independent hardware manufacturers.

Version 2.1 includes support for OS/2, Microsoft Corp. Windows 3.1 and DOS applications running concurrently on a single display. It also includes drivers for 256-color XGA and Super Video Graphics Adapters screen displays, as well as high-speed printers and CD-ROM drives.

For more information or to order the beta version, call (800) 342-6672.

Lapis Technologies, Inc. has announced a new line of Macintosh Ethernet adapter boards that also provide video display capabilities.

Called the DisplayNet line, the boards are compatible with Apple Computer, Inc. Macintosh SE/30, LC, IIsi, II and Quadra Macintoshes. In addition to providing support for 10Base-T twisted-pair and thin-wire 10Base-2 Ethernet connections, the boards support Lapis' Full Page Display and Two Page Display 1-bit monochrome video displays.

The DisplayNet line is made up of four interface boards. DisplayNet II supports both 10Base-T and 10Base-2 for all Macintosh NuBus platforms. DisplayNet PDS/30 offers 10Base-T and 10Base-2 support for the Macintosh SE/30 and IIsi, but requires a Premises Distribution System adapter. For the LC, DisplayNet LC-T provides a 10Base-T connection, while DisplayNet LC-Thin offers a 10Base-2 connection.

All DisplayNet boards will ship in the first quarter of 1993 and are priced at $549 each with a one-year warranty. For more information, contact Lapis at (510) 748-1600.

Artisoft, Inc. announced it is preloading Version 2.0 of its StationWare software on its Central Station connectivity processor.

The Central Station processor is a modem-sized hardware device with one parallel and two serial ports that provides connectivity to a variety of peripherals for LANtastic or Novell, Inc. Ethernet local-area networks.

The Central Station/StationWare 2.0 bundles cost $99. Current users can upgrade to the new version for $50. For more information, contact Artisoft at (602) 293-6363.

Software keeps eye on networks

continued from page 11

sion 3.0 include zone checking, which enables administrators to partition the net and customize the level and frequency of device monitoring according to different corporate departments.

E-mail support

Version 3.0 offers support for the Apple Open Collaboration Environment (OCE), which enables it to notify administrators of problems via OCE E-mail, as well as the Simple Mail Transfer Protocol (SMTP), which enables it to communicate directly via Unix-based E-mail packages without a gateway.

Additionally, the new version lets users schedule priority testing for critical network devices. For example, critical devices could be monitored continuously, while less critical devices could be set to be monitored every 30 minutes.

Scheduled to ship in February, NetWorks Version 3.0 costs $995 for a package that can monitor between 50 and 60 devices. The software is tagged at $295 for the Jr. Version, which monitors 20 devices.

Users demand a simpler way

continued from page 1

hard they try."

To cope with the problem, some users are finding ways to configure routers across an enterprise from a central site and are pressing vendors for improved centralized management and configuration capabilities. They are also demanding that vendors provide more intuitive user interfaces to simplify configuration.

Most vendors concede there are problems with configuration and report that they are working to help users deal with the complexities.

> "What users want is centralized configuration because they don't want end users at remote sites manipulating the equipment if they don't have to," Merritt said.
>
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Don Listwin, Cisco Systems, Inc.'s director of product marketing, said Cisco is developing tools that will enable users to centrally configure a sprawling network of hundreds — even thousands — of routers.

While declining to provide specifics, Listwin said one tool will include generic configuration profiles that can be downloaded to remote routers from a central management system, obviating the need to configure each device from scratch.

Cisco has already made strides toward that goal with its new CiscoWorks series of management applications that run on a SunNet Manager platform. One configuration file management program includes a database that lets users download new configurations on-the-fly without any rebooting required.

IBM, 3Com Corp. and Wellfleet Communications, Inc. also favor a centralized approach to router configuration. All provide users with the ability to set up a central repository for all router software images and configuration files.

Wellfleet's Simple Network Management Protocol-based Site Manager application will enable an administrator to call up a graphical image of a Wellfleet router, dynamically reconfigure it and download new software.

IBM's Configuration Program for its 6611 Network Processor maintains multiple router configurations in a database that can be pulled up and changed as needed in real time and then downloaded to the remote routers via Transmission Control Protocol/Internet Protocol links.

3Com recently announced its Boundary Routing Systems Architecture for feeder routers under which remote routers rely on a high-end central router to provide them with configuration services.

John Merritt, vice-president of Southwest Network Services, Inc., a systems integrator in Austin, Texas, said most of the users he works with find router configuration clumsy and cumbersome today.

"What users want is centralized configuration because they don't want end users at remote sites manipulating the equipment if they don't have to," he said.

> "Routing is becoming more commercially available and accessible, like bridging," Bauer said.
>
> ▲▲▲

"Especially when you consider users are busy with their core business, why would they want to play around with a router?"

Enabling the many

Central-site configuration capabilities enable a few router experts to handle installation and set-up for devices throughout a network. But some vendors believe the answer to the configuration problem is simplification, not centralization.

Kurt Bauer, director of product marketing at Advanced Computer Communications (ACC), said his company is working to make router configuration something a wider array of users can handle.

"Routing is becoming more commercially available and accessible, just like bridging," he said. "We want to make configuration and overall management of internets as simple as possible for all users instead of keeping it mysterious to all but a select few."

Bauer declined to provide specific details but said ACC is now investing heavily in a more elegant interface for its routers. The vendor is also evaluating development of a menu-driven interface that can walk even an inexperienced user through configuration step-by-step.

Last fall, Proteon, Inc. unveiled an easy-to-configure router — called the DNX 300m bridge/router — aimed at novice

(continued on page 16)

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IBM

Net mgmt. tool vendor set for big product push in '93

VisiSoft hires new chief, garners $1.5m in capital.

By Bob Brown
Senior Editor

ATLANTA — Revving up for a run at the big guns in the network and systems management markets, VisiSoft, Inc. has named an industry veteran as its new chief and secured an initial round of venture capital worth $1.5 million.

Greg Goodall, VisiSoft's new president and chief executive officer, last week said his firm received its funding package from DSV Ventures of Princeton, N.J., on Christmas Eve. The money will support VisiSoft as it targets customers of Hewlett-Packard Co., SunConnect and other net management vendors this year, said Goodall, a former Digital Communications Associates, Inc. executive and founder of Fox Research, Inc.

VisiSoft, based here, provides a Microsoft Corp. Windows-based network and system management product called VisiNet, which manages personal computers and Simple Network Management Protocol devices across multiple local-area networks.

VisiNet contains a proprietary database, advanced scripting for customizing alarm notifications and trouble-ticketing capabilities, among other features. The software can be used to display real-time network events and historical operating data.

"[VisiSoft] is not well known simply because it really didn't have the funds to help create the visibility," said Goodall, who was brought aboard to help the firm attract funding and gain market awareness. "The company quietly has been doing some good work and developed an interesting piece of technology that Microsoft, among others, has noticed."

VisiSoft already boasts several large users, including GTE Corp. and the Internal Revenue Service. Also, it has several VisiNet enhancements planned for 1993, including support for IBM's OS/2, Microsoft's Windows NT and Apple Computer, Inc.'s Macintosh. The firm also plans to divulge more about its relationship with Microsoft, under which VisiSoft has developed SNMP and software distribution technology for Microsoft products.

VisiSoft is a start-up in spirit, if not in reality. It has evolved over the past 18 months out of a systems integration firm, Technology Dynamics, Inc., which had expertise in network management and worked on projects for DCA, among other firms.

VisiNet, which began shipping in August 1991, was originally designed to manage either PCs or SNMP devices on a single network type. For example, it could be used across LAN Manager or Novell, Inc. NetWare networks. The product was revised in July to manage both PCs and SNMP devices across integrated LAN Manager, NetWare and Network Basic I/O System nets.

Al McCabe, vice-president of sales at VisiSoft, said VisiNet differs from products from HP, Novell and SunConnect in several ways. One key differentiator is VisiNet's graphical user interface, which features user-definable icons that can provide hierarchical views of a network — from an enterprisewide view down to a single board, he said. Also, VisiNet can handle more statistics and evaluate more fields than other net management systems, he added.

Greg Goodall

Charlie Robbins, director of communications research at Aberdeen Group, Inc., a Boston-based market research firm, said VisiSoft is well positioned even though HP, Digital Equipment Corp. and others have announced plans to focus on PC-based products for managing networks and other PCs.

"There is network and system management now, and the long-term goal is to move them closer together and do them across multiple platforms and automate that," Robbins said. "Getting there is a process, and no one is [all the way] there today. But here is a piece of software that addresses the PC management area, and its opportunity is to expand outward and get into some very large nets to manage thousands of PCs."

Users demand a simpler way

continued from page 13

users at remote sites.

One of the drawbacks of a centralized approach today is reliance on the Trivial File Transfer Protocol (TFTP), the TCP/IP service for file transfers. In a common scenario, a remote router can request a configuration image from a TFTP server. However, if there is a network glitch, the TFTP server cannot update a remote router's configuration until the problem is resolved.

Many vendors have begun to equip their routers with nonvolatile storage. IBM's 6611 Network Processor, for instance, is equipped with a hard drive so the device has the capability of not only keeping a current configuration image in its memory, but also has the ability to maintain multiple configuration profiles.

Another way vendors are working to make router configuration simpler, even for sophisticated network pros such as Kadlac, is by providing more intuitive user interfaces.

Some vendors favor a command line interface, while others insist that a menu-based approach is preferrable. But regardless of the preferred method, vendors said they will improve the interface by, among other things, relying more on defaults.

"It doesn't really matter whether the user is going through a command line or a Windows-driven system," said Eric Teagarden, IBM's senior programmer in technical support for the 6611. "Defaults are the key to not having to type in a laborious configuration and not having to go through a whole bunch of windows."

> Vendors are working to make configuration simpler by providing more intuitive interfaces.
>
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Two 3Com terminals on tap

continued from page 2

support for four different protocols," said Andy Gottlieb, product-line manager for terminal servers at 3Com.

The servers, which come with 6M bytes of standard memory expandable to 10M bytes, support as many as eight simultaneous sessions per port, allowing users to access applications on multiple hosts running the same or different protocols.

The devices feature an optional modular transceiver interface that provides either a 10M bit/sec 10Base2, unshielded twisted-pair 10Base-T or fiber-optic connection to a local-area network supporting the hosts. An attachment unit interface module is also available. The serial ports support speeds up to 38.4K bit/sec.

> Texas Children's Hospital was pleased with the small footprint of the high-density box.
>
> ▲▲▲

The CS/3000 and CS/3100 support the Simple Network Management Protocol and offer out-of-band management capabilities. If the network connection is broken, for example, the terminal server can manage other network devices by direct or modem links. Out-of-band management also lets the user attach the terminal server to other net devices and configure them from a local or remote management station.

Both models can be booted remotely via 3Com's Remote Boot and Configuration Service (RBCS), which runs on SunConnect's SunNet Manager platform.

"We released RBCS Version 2.0 this month, which comes with a configuration editor for our terminal servers that will make it easier to configure multiple ports on a single terminal server as well as multiple terminal servers on the network," Gottlieb said.

Dave Schiller, director of network services and technical support at Texas Children's Hospital in Houston, a beta-test site for the CS/3000, was pleased with the small footprint of the high-density box.

"We were very happy with the slim design, especially in a hospital environment where space is always a concern," he said. "The support for the LAT drivers and protocol is also nice because a lot of third parties have trouble providing that in an effective way. It's nice to see two companies like 3Com and DEC working together [via a licensing agreement] to do something right."

Pricing starts at $6,500 for the CS/3000 and $6,900 for the CS/3100. The nonfiber transceiver interfaces cost between $139 and $175, while the fiber version is $379. Both models are available now.

3Com bolsters token-ring line

continued from page 3

3Com with a more comprehensive hub offering than current industry leaders Cabletron Systems, Inc. and SynOptics Communications, Inc.

It will also bolster 3Com's standing in the bridge/router arena, where the firm has been targeting the Systems Network Architecture market. The company is one of only a handful of vendors that has secured an agreement to license IBM's APPN Network Node code.

"3Com has made it very clear this past year that it intends to become one of the major players in the router and hub field, but, until now, its somewhat weak token-ring support has been a hindrance," he said. "3Com is poised to make good on that statement."

Star-Tek began carving its niche in the hub market in 1987 with hubs that support token-ring local-area networks over unshielded twisted-pair wire. It was the first vendor to support 16M bit/sec token ring over unshielded twisted pair, a technology that has since been blessed by such industry heavyweights as IBM and SynOptics.

Guruge said Star-Tek has come out with other leading-edge features that give its hubs support for longer cable runs and more devices. Its Focus Series intelligent hub line, which supports token ring and Ethernet, supports up to 260 nodes that can be located 200 meters from the hub.

This contrasts with similar offerings from IBM and SynOptics that support 130 devices on a single hub at distances up to 100 meters from the hub.

Benhamou said Star-Tek's hub offerings will complement those currently offered by 3Com. 3Com's LinkBuilder ECS hubs support only Ethernet LANs, while Star-Tek's Focus Series hubs are geared toward token ring. 3Com's LinkBuilder FMS line of stackable Ethernet hubs will complement Star-Tek's soon-to-be-announced line of stackable token-ring hubs.

Those hubs, which will be rolled out within the next 60 days, will address the need for token-ring devices at the work group level, said Peter Williams, Star-Tek's vice-president of research and development, who will become president of Star-Tek and a vice-president of 3Com after the acquisition.

"The thinking behind that rollout is that the token-ring hub market will experience strong growth in the trend to stackable devices, especially in remote branch offices," Williams said.

According to Benhamou, Star-Tek's technology may also be incorporated into 3Com's high-end LinkBuilder 3GH hub, which presently supports only Ethernet and Fiber Distributed Data Interface LANs.

Staff Writer Skip MacAskill contributed to this story.

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INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

"In America, we're good at cranking out technology. It's the use of the technology that's at issue for all of us in the industry."

Joe Adams
Director of communications
Software Artistry, Inc.
Indianapolis

Link Notes

The Interop Co. and **Novell, Inc.** last week announced they will start a new event in 1994 called NetWorld/INTEROP 94.

The aim of the new show is to produce a single integrated exhibition and educational program designed to aid users in understanding the growing interoperability issues at all levels of computing and communications.

Under terms of the agreement with Interop, Novell has licensed global rights to use the name and manage the new show, which is scheduled to be launched in January 1994.

Hughes LAN Systems, Inc. has announced the Ethernet Segment Extension Module for its 14-slot Enterprise Hub that sits on all three of the hub's Ethernet backplanes and is equipped with Transceiver Modules.

The transceivers may be of any type and support a variety of cable types, including fiber optic, twisted pair, attachment unit interface and thin Ethernet.

The module costs $1,495 and is available now.

David Systems, Inc. has announced the ExpressNet Workgroup Hub, a 24-port, Simple Network Management Protocol-based 10Base-T hub

(continued on page 20)

INTERNETWORK MONITOR

BY SCOTT BRADNER

An insider's guide to internetworking

The prospect of writing a regular column in a publication with such a large circulation is more than a bit daunting.

What could make this one person's opinions, descriptions or pronouncements worthwhile reading for others? It is a big screen on which to make a fool of oneself. Well, I'm sure you will let me know whether my efforts prove commendable.

In this initial column, I'll attempt to introduce myself and give you an idea of the topics I plan to address in the future.

First, a bit about my background. I have been working for Harvard University for almost 28 years. Perhaps that is somewhat overstable in these days of high-technology corporate mutation and job migration, but it has been fun.

I spent the first 25 years there in the psychology department, mostly as manager of its computer center and a senior preceptor offering courses in computer programming and electronic design.

My experiences ran the gamut from helping teach pigeons to peck the correct key the correct percentage of the time to assisting countless students in understanding the mysteries of programming and text editing.

I then moved over to the network services division of the Office for Information Technology. Here, I have been working on projects ranging from finding the right conduit into yet another of Harvard's myriad of buildings to operating the campus news server.

Other current duties include serving as the chairman of the technical committee as well as a member of the steering committee of the New England Academic and Research Network. I also serve as Harvard's Bitnet technical liaison and the manager of the Harvard Network Device Test Laboratory. This test lab is used to run the annual series of Harvard bridge and router performance tests.

This column will include comments on a variety of topics stretching from network technology, processes and procedures to airline food. (Can't someone arrest those people for substance abuse?)

The column titles will include: "Aiming at the foot," about silly or counterproductive business and political decisions; "Aiming at the target," about other types of decisions (often too rare); "From the net," summaries of discussions from one or more of the Internet mailing lists; "Along the road," about progress along the path to ubiquitous data networking (Don't you look forward to that prospect?); and "Roadblocks," warnings of problems that are on the way.

With the complexity of today's data networking technology and the issues surrounding the application of this technology, it is almost impossible for one individual to understand all the facets of a specific topic.

Many of the upcoming columns will conclude with a contributors' listing, which will acknowledge those who have assisted in understanding the topic at hand.

My electronic mail address will be at the bottom of each column. If you have comments or suggestions, send me a note. (The address is easy to remember. As Stan Barber, the other "SOB" on the Internet put it, "Two of us admit it, the rest . . .")

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

"The most frequently asked questions by users in tutorials, sessions and on the show floor at INTEROP [92 Fall] involved the status of the various incantations of SNMP."

Jeff Case
President
SNMP Research, Inc.

On the winding road to SNMP Version 2

Case, Rose map out the evolution of SNMP, contrasting multiple versions of the IETF standard.

By Maureen Molloy
Senior Writer

Keeping straight on the latest developments in the Simple Network Management Protocol camp is anything but simple.

The protocol, initially standardized in 1988 to provide a common means for monitoring and controlling multivendor local-area network and internetwork devices, has been continuously refined. Now we have SNMP Security, the Simple Management Protocol (SMP) and SNMP Version 2 being bandied about.

Jeff Case and Marshall Rose, two of the original developers of SNMP, are frequently asked by users to contrast these multiple versions of the Internet Engineering Task Force's (IETF) standard net management protocol.

Interim steps

Rose, president of Dover Beach Consulting, Inc. in Mountain View, Calif., said SNMP Security and SMP are two interim SNMP refinements that ultimately will be incorporated into the SNMP Version 2 standard, which is expected to be ratified by this spring.

The original SNMP was designed to give net managers a central vantage point from which to monitor and control networked devices with little complexity or overhead.

The protocol essentially carries information between a network management station and various agents residing in bridges, routers, terminal servers, personal computers, hosts and other network gear.

SNMP Security was the first proposed standard aimed at improving one of the key deficiencies of SNMP, specifically, in the area of authentication, authorization, access control and privacy. Without security, people have been reluctant to use SNMP to control net devices due to fear that they would leave their nets open to sabotage, settling instead on basic monitoring functions for security.

Coordinated transition

SNMP Security was recently superseded by the newer SMP proposal, which incorporates SNMP's security safeguard features. Case said the IETF last summer decided that SNMP Security would not be deployed as previously described in request for comment (RFC) documents but, instead, would be deployed simultaneously with SMP and SNMP Version 2 in order to provide a single transition for users and vendors.

Consequently, users should not expect vendors to develop products based on the SNMP Security documents, which will soon be relegated to historical status. Furthermore, any products currently based on those documents are obsolete because they either will not be interoperable with SMP or SNMP Version 2.

SMP is the next step in the ongoing improvement of SNMP and is a technically more elegant and complete protocol than the former version, according to Case.

(continued on page 20)

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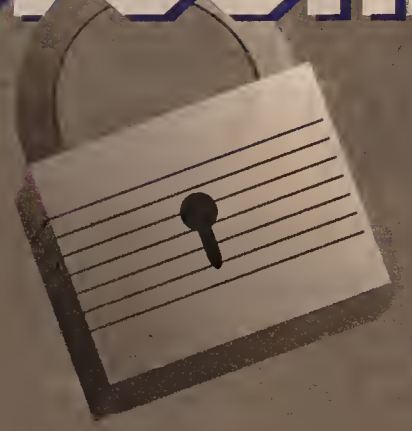

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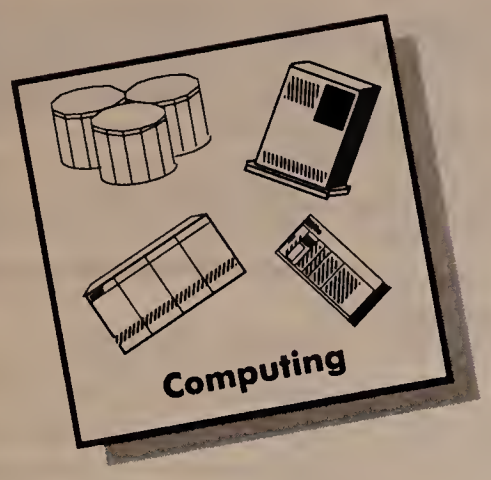

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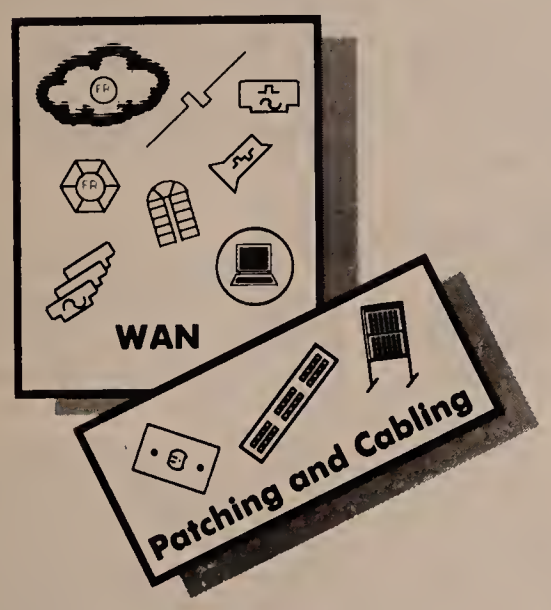

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On the winding road to SNMP Version 2

continued from page 17

Unlike SNMP, which provides management support for only net devices, SMP lets users manage applications on hosts and PCs. In addition to engulfing the security features of SNMP Security, other key enhancements include allowing efficient handling of bulk data transfers from managed elements, manager-to-manager interaction and expanded net protocol support.

The bulk retrieval data transfer feature speeds the transfer rate of information and reduces the load on the net. The manager-to-manager interaction feature enables communications between net management stations, thereby letting users set up management hierarchies — something that is not possible with SNMP.

Deleting limitations

The Transmission Control Protocol/Internet Protocol-centric aspects of SNMP were also removed so that SMP can run above TCP/IP, Apple Computer, Inc.'s AppleTalk, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Open Systems Interconnection nets.

Like SNMP Security, SMP is only an interim specification, and users will not find actual products that adhere to the SMP RFC documents. Rather, vendors will develop products based on SNMP Version 2, the latest proposal now making its way through the IETF standards group.

Because SNMP Version 2 is based on the SMP documents, the two proposed standards will differ depending on the extent that the SMP proposals are modified during the standards process, Case said.

So far, a few minor editorial modifications have been made, but the key elements of SMP — including the bulk data transfer, manager-to-manager interaction and transport independence — have remained intact and are identical in SNMP Version 2.

Case said the final SNMP Version 2 will be backward compatible with the original SNMP standard so SNMP Version 2 managers deployed in internets will be interoperable with existing SNMP agent devices.

Link Notes

continued from page 17

that is expandable to 48 or 72 ports with the addition of Workgroup Expansion Hubs. An extension of the company's ExpressNet Hub product family, the Workgroup Hub offers SNMP-managed local-area network connections at $94 per port.

The ExpressNet Workgroup Hubs — the 6360, with RJ-45 jacks, and the 6364, with 50-pin telephone company connectors — provide 24 10Base-T ports and cost $2,990 each. The 6361 (with RJ-45s) and 6365 (with 50-pin connectors) also provide 24 10Base-T ports as well as an integrated local Ethernet bridge. Both hubs cost $4,490.

Four Workgroup Expansion Hubs round out the product family. Priced at $1,890, the 6362 (RJ-45) and the 6366 (50-pin) provide 24 additional 10Base-T ports to expand the Workgroup Hub to 48 ports. Model 6363 and 6367 Expansion Hubs provide an additional 48 ports to the Workgroup Hub base units, for a total of 72 ports. Both cost $3,790.

The ExpressNet Workgroup Hubs, which will be demonstrated at NetWorld 93 Boston next week, will be available this quarter.

Cabletron Systems, Inc. has rolled out the Communications Server Media Interface Module (CSMIM) for its Multi Media Access Center intelligent hub line that allows terminals and serial devices to attach directly to Ethernet local-area networks. Developed jointly with **Xylogics, Inc.**, the CSMIM comes in 16- and 32-port versions and offers remote dial-in capabilities via a modem. Available in 90 days, the 16-port version is priced at $3,695 and the 32-port model is priced at $4,795. An upgrade from the 16- to 32-port version is available for $1,195.

RAD Network Devices, Inc. announced it has lowered the price of its Local Token Ring Bridge (LTB) by as much as 30%. The LTB with IBM LAN Manager support has been reduced from $4,995 to $3,495, while the LTB with LAN Manager and Simple Network Management Protocol support has been reduced from $5,495 to $3,995. These new prices are effective immediately.

Bridge and router vendor **Retix** has signed a wide ranging distribution agreement with **Avnet, Inc.** under which Avnet will distribute Retix products through its Avnet Computer Division and provide a range of technical, financial, customer support and maintenance services.

Worth Noting

Competition in the 800 service market did not arrive until MCI Communications Corp. began offering toll-free service in 1987, 20 years after rival AT&T launched its 800 service.

Carrier Watch

AT&T is pressing five large users to give more details about a joint complaint they filed with the Federal Communications Commission in September accusing AT&T of overcharging them for short-haul private lines.

The users — Charles Schwab and Company, Inc., Japan Air Lines/American Region, Quotron Systems, Inc., Texaco, Inc. and TRW Information Systems Group's Credit Data Division — claim that AT&T is charging them two to three times as much for private lines as it should be charging.

The dispute centers around the way in which AT&T configures intra-local access and transport area private lines.

The users say AT&T's tariff does not explain that there is a configuration option. They discovered on their own that if a user asks for a private line directly between two sites, it is much less expensive than the configuration AT&T chooses if the user does not specify a preference. When no preference is cited, AT&T configures the private line via an AT&T office, which doubles the number of access charges.

AT&T has said the users were all briefed about the configuration options on private lines and has kicked off the first step in the FCC complaint process by asking the users for

(continued on page 28)

MCI challenges AT&T in fight over 800 technology

Counters AT&T accusation with court petition.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. has launched a counterattack in an increasingly bitter battle with AT&T over which company owns some critical patents supporting 800 service.

Last month, AT&T accused MCI of infringing on several patents for technologies underlying credit card verification, database lookup of 800 numbers, the Feature Group D equal access protocol and the use of automatic number identification to determine whether a users' account is in good standing.

Two weeks ago, MCI filed a petition in the U.S. District Court for the District of Columbia in an attempt to stop AT&T's efforts to block MCI's use of these technologies. "AT&T is using claimed patent rights to attack the ability of MCI and others to offer basic forms of long-distance service," MCI told the court.

So far, AT&T has only attacked MCI's use of the technologies, but several sources said that other long-distance carriers may be using some or all of the technologies and could be next on the hit list. Other carriers were unwilling to say if AT&T is questioning their use of the patents.

AT&T had hoped to avoid a court battle over the patents, claiming that it was trying to negotiate with MCI a royalty for its use of the patents. "We don't plan to let MCI have a free ride on our technology," the spokesman said. "We will prove in court that our patents are valid."

This latest skirmish between MCI and AT&T comes as competition between carriers heats up over 800 service, with the deadline for 800 portability set for May 1. MCI has said a number of major 800 customers will begin switching to MCI as soon as portability arrives, with the potential of adding $1 billion in revenue to its coffers in 1993.

In its filing, MCI denied in-

(continued on page 28)

Carrier gets green light for caller ID in two states

By Bob Wallace
Senior Editor

ST. LOUIS — Southwestern Bell Corp. last week received approval from state regulators to offer caller ID service with free per-call blocking in selected cities in Kansas and Arkansas.

The company will introduce caller identification service in Lawrence, Kan., on Jan. 18 and in Arkadelphia and West Memphis, Ark., in late January.

"In Kansas, our business offices received calls from more than 2,000 customers saying they wanted caller ID," said Lisa Wilder, Southwestern Bell's caller ID marketing manager. "We've never seen so much unsolicited support from customers for a perspective service."

Businesses see caller ID as a means of enhancing customer service and speeding call processing, but some consumers say the service constitutes an invasion of privacy

In fact, two local exchange carriers have cancelled plans to offer caller ID in California. Pacific Bell and GTE Corp. recently said that consumers' desire for privacy would have severely limited the appeal of the service. The state has the nation's largest percentage (40%) of unlisted numbers in the nation.

Call blocking

Privacy concerns prompted Southwestern Bell to offer free call blocking with caller ID. With per-call blocking, the caller can key-in a short code before dialing each call to block transmission of the phone number.

Southwestern Bell said blocking will not be available from pay phones.

"There are times when customers may not want their number or names disclosed," Wilder said. "Our policy respects customers' privacy concerns and

(continued on page 28)

FCC slowly allows competition for international switched services

July 1990	Alpha Lyracom Space Communications, Inc. petitions FCC to change its rules and allow competition for international switched services.
Dec. 1991	Bush administration backs plans to open international switched services to competition by 1997. FCC votes to allow resale of international private lines between the U.S. and other countries that allow equivalent resale opportunities. FCC proposes dropping dominant regulation of foreign carriers operating in the U.S. for routes on which the foreign carrier is not the dominant carrier in the remote country.
March 1992	FCC votes to lift restrictions on competition for international switched services connected to the public switched network in Jan. 1997 and allows immediate competition for switched services not connected to the public switched network.
Oct. 1992	FCC drops dominant regulation rules for foreign carriers operating in the U.S. on routes for which the foreign carrier is not the dominant carrier in the foreign country and allows fONOROLA Corp. to enter U.S. to resell switched services to Canada over private lines.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *NETWORK WORLD*

AT&T changes stand on U.S.-Canada resale

Disagrees with FCC's decision that conditions are equal on both sides of the U.S.-Canadian border.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Despite initial support for the idea, AT&T is now complaining that the FCC may have acted too hastily in allowing a Canadian firm to set up shop in the U.S. and begin reselling switched service over private lines between the two countries.

In October, the Federal Communications Commission gave permission to fONOROLA Corp., one of Canada's three largest resellers, to begin operating in the U.S. The agency justified its decision under a policy adopted in December 1991 that allowed foreign carriers to begin resale operations in the U.S. if equivalent opportunities for U.S. carriers exist in the foreign carrier's country.

After evaluating Canadian regulations and market conditions, the FCC concluded that Canada offers ample resale opportunities for U.S. carriers operating there. It found that out of 80 resellers doing business in Canada, 11 were U.S. firms ("FCC clears way for foreign carriers to better compete," *NW,* Oct. 12).

In October, AT&T said in a prepared statement that it supported the FCC's decision.

"AT&T is encouraged that the commissioners today made clear that before allowing a foreign-based carrier to operate in the U.S., they will consider whether U.S. carriers have access to that foreign carrier's home market," the carrier said.

But recently, AT&T filed a petition with the FCC, asking the agency to overturn its approval of fONOROLA's acceptance into the

> The FCC said Canada offers ample resale opportunities for U.S. carriers.
>
> ▲▲▲

U.S. market. AT&T said the FCC looked at whether Canada applied its regulations in the same manner to both Canadian and U.S. resellers but neglected to examine whether the opportunities for resale are truly equivalent.

"The [FCC] order undertakes no comparative analysis as to whether the particular conditions are even broadly equivalent to those available under U.S. law," AT&T said.

(continued on page 28)

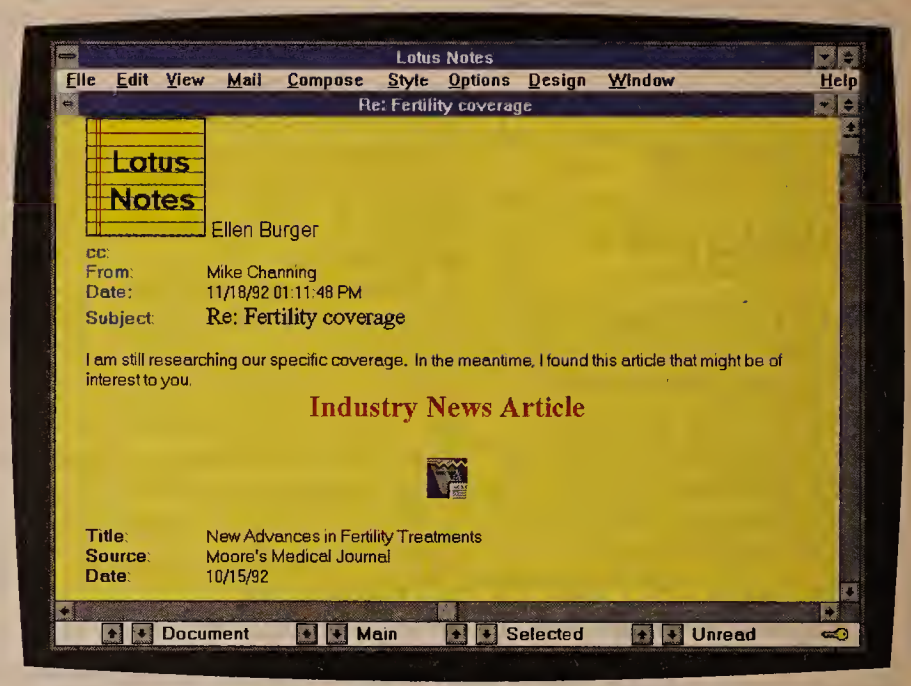
1. This is Mike's Notes desktop. Each icon represents a different database. In the course of the day, these are the ones he uses most frequently. To start the day, Mike decides to check if any new benefits questions have been forwarded his way. He double-clicks on the HR INQUIRY TRACKING icon.

2. 

Well, there's one that hasn't been read. Ellen Burger has a question about her coverage. Ellen called the company's BENEFITS HOTLINE. The operator entered her query into Notes and it was automatically routed to Mike. Mike double-clicks to find out what the problem is.

5. 

He simply double-clicks INDUSTRY NEWS, and searches two categories: In vitro fertilization and artificial insemination. First up is a recent story from Moore's Medical Journal. Since the article includes authoritative information, he decides to forward it to Ellen.



6. 

Mike quickly composes a note and forwards this document directly to Ellen. That done, he gets himself a cup of coffee.

Mike Channing
Benefits Liaison

To demonstrate th had to make an

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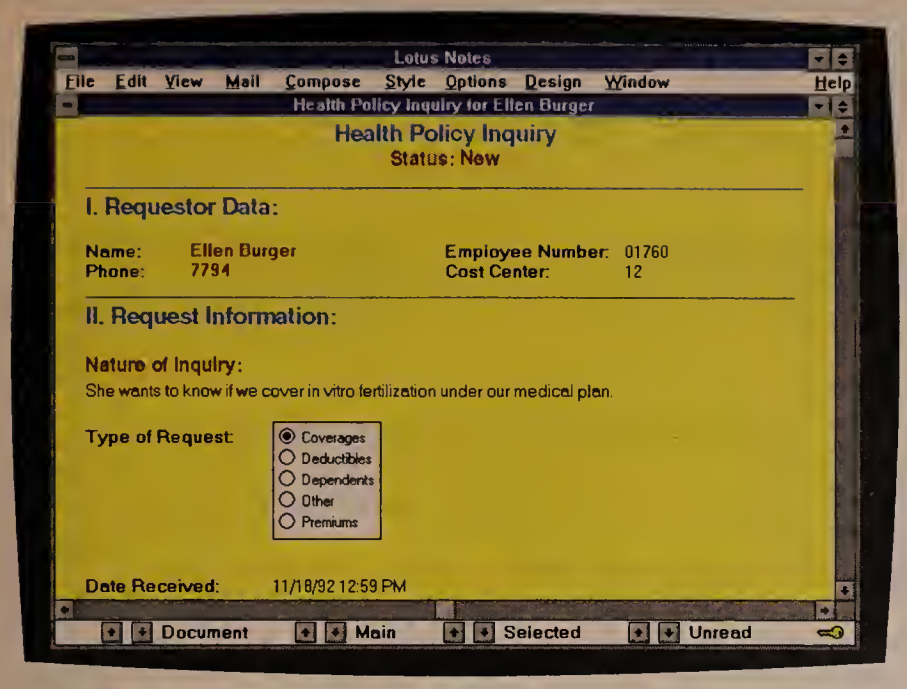
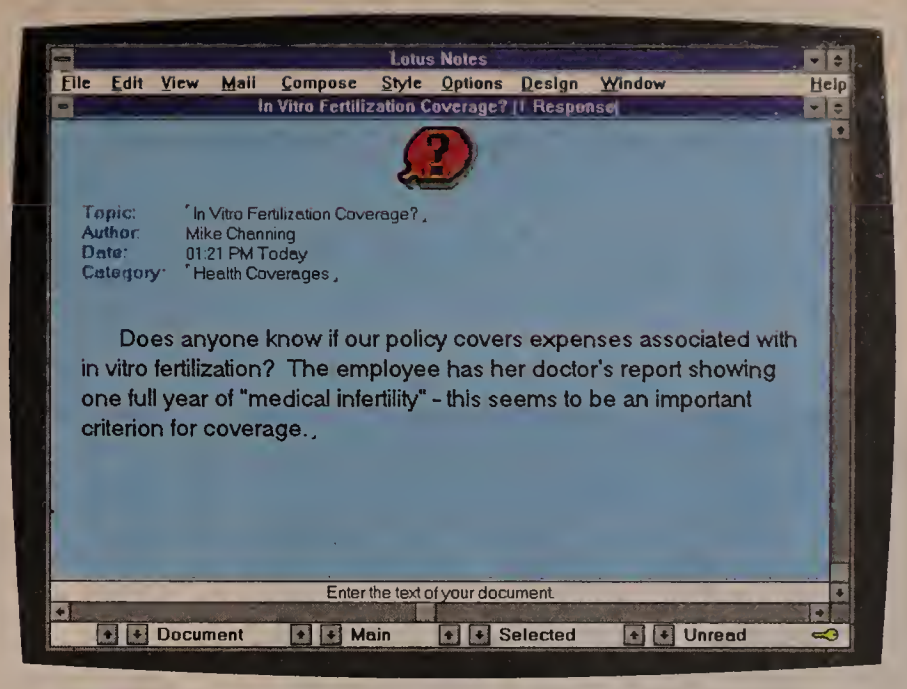
Let's watch how Mike Channing uses it: As a tracking tool for customer service. As a conferencing system for collaborative problem solving. And as a library for policies, documentation or news.



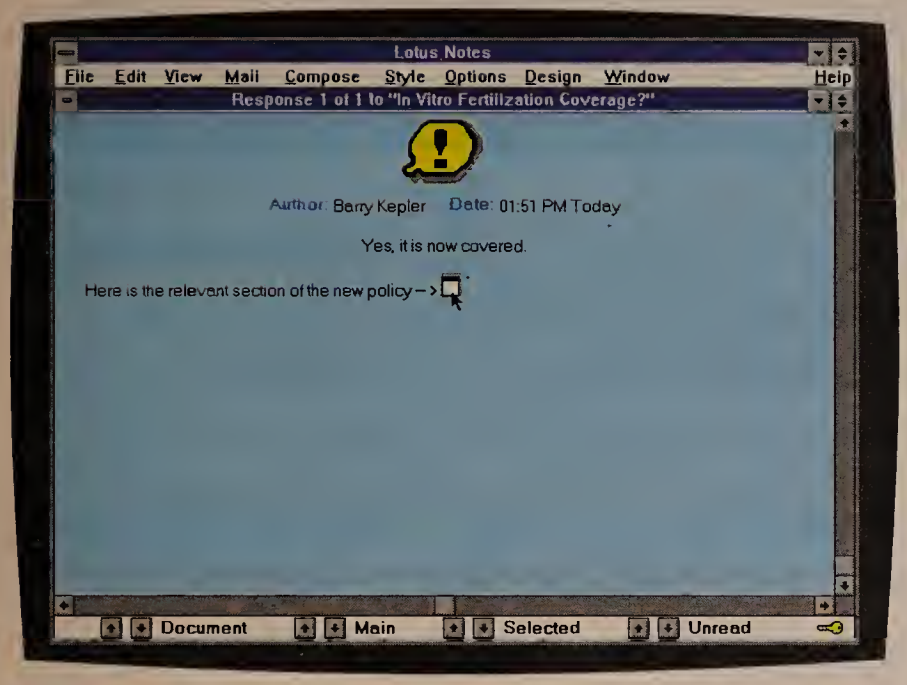
3. HR Inquiry Tracking

Up comes the inquiry screen. Ellen wants to know if the company covers in vitro fertilization. Mike, being new, is stumped. He calls his supervisor on the phone for the answer. He's not in yet. Instead of waiting, Mike decides to post the question on the GROUP DISCUSSION database, thinking that someone else might know the answer and respond more quickly.



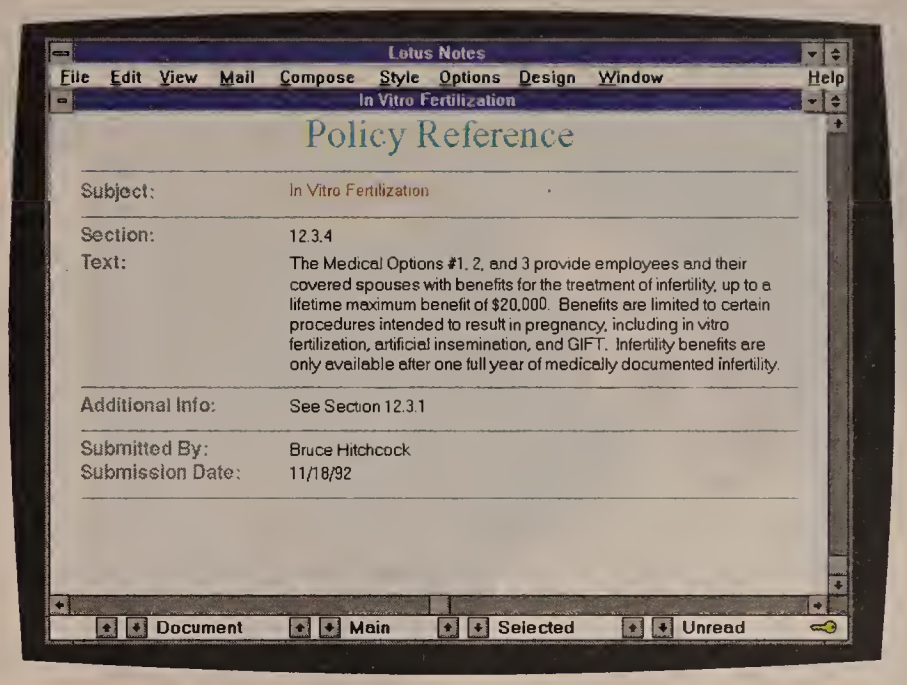
4. Group Discussion

He double-clicks the GROUP DISCUSSION icon. Once in GROUP DISCUSSION, he poses the question to his workgroup. Eager to help, Mike then decides to check out the INDUSTRY NEWS database for any background information that might be useful to Ellen.



7. Group Discussion

When he gets back to his desk, Mike checks back into the GROUP DISCUSSION database for responses. Not only has Barry Kepler responded with the answer, Barry actually leads Mike to the relevant section of the corporate policy manual by creating a direct link to the document.



8. Policy Reference

Mike clicks the DOC LINK icon. Up comes the relevant section of the policy. Mike jots a quick message and forwards both to Ellen. Job done, in less than 10 minutes, by easily tapping into expertise both inside and outside the company.

e power of Notes, we example of Mike.

Watch how Notes organizes information so it's easy for Mike to get the answers he needs. How effortlessly he taps his workgroup's knowledge. How quickly he accesses conventional references. Now you can see why people who have Notes build their work around it. And why the companies that have installed Notes have seen as much as a 400% return on their investment.*

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Worth Noting

"The overall consensus was that a seamless wireless-wireline public network would exist by the end, if not the middle, of the 1990s."

From the report, "User Perspectives on the Future of Wireless Communications," conducted by Deloitte & Touche of Washington, D.C.

Store & Forward

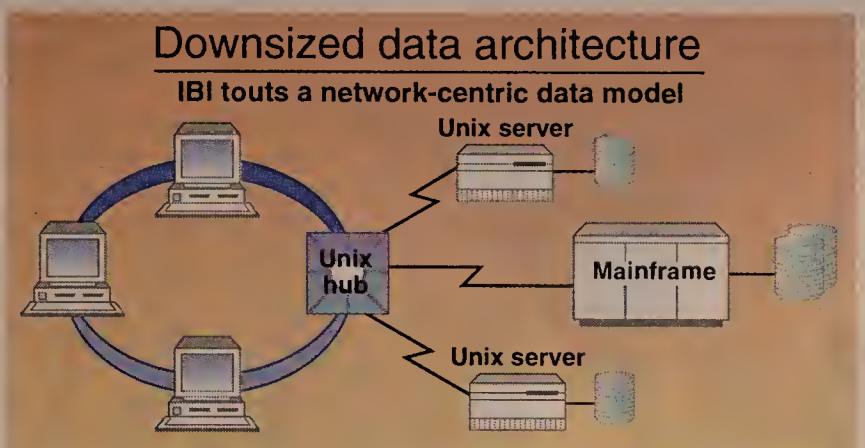
VXM Technologies, Inc. recently announced a cooperative processing tool that lets programmers distribute parts of an application across multiple, heterogeneous Unix processors to speed processing output.

PowerTools lets programmers build objects from compute-intensive subroutines within an application. During run-time, PowerTools can automatically distribute these objects across a Transmission Control Protocol/Internet Protocol network to dozens of Unix processors for simultaneous computation.

PowerTools can be used to improve performance of image compression routines, spreadsheet calculations and other commonly used routines.

VXM officials claim that PowerTools lets users build a network-based processing system that surpasses the performance of a Cray Research, Inc. supercomputer. PowerTools supports Unix processors from Digital Equipment Corp., Hewlett-Packard Co., IBM, Silicon Graphics, Inc. and Sun Microsystems, Inc.

A 10-node PowerTools license costs $2,495, and five-node additions cost $995. PowerTools is available now on Sun's SunOS 4.1 platform. Other Unix platforms will be available in January.



In a net-centric data model, Unix machines serve as intermediate data hubs for storing local data and providing access to data repositories on remote Unix or mainframe servers.

GRAPHIC BY SUSAN SLATER SOURCE: INFORMATION BUILDERS, INC., NEW YORK

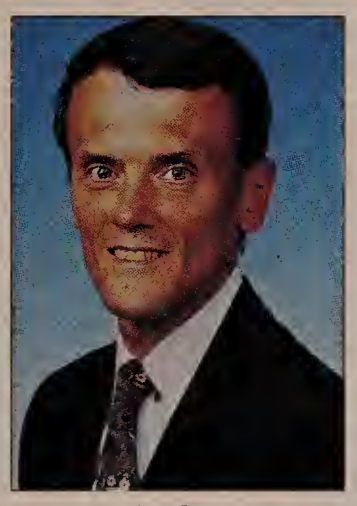
IBI's EDA/SQL software leads the data access pack

All-encompassing tool takes industry by storm.

By Wayne Eckerson
Senior Editor

NEW YORK — It's been little more than a year since Information Builders, Inc. (IBI) launched its Enterprise Data Access (EDA)/SQL tool, but the product is already becoming a de facto standard for data access.

"No one can catch [EDA/SQL]," said Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. "It supports so many data sources that any vendor would be foolish to try and compete with it."



John Senor

Currently, EDA/SQL client/server software provides access to more than 50 relational and nonrelational databases running on 35 different hardware platforms. EDA/SQL server software runs on 14 platforms, including IBM's MVS, VM, OS/2 and RISC System/6000, and works with almost 100 client applications or tools.

John Senor, vice-president of IBI's EDA Division, said EDA/SQL's success is no fluke.

The firm spent 15 years building expertise in accessing multiple data sources while developing its flagship product, Focus, a fourth-generation language application development tool, he said.

IBI launched EDA/SQL in September of 1991 after it was approached by IBM, which was looking for tools to flesh out its Information Warehouse, a strategy to provide seamless connectivity to enterprisewide data.

Information Warehouse uses IBM's Distributed Relational Data Access method to provide links to IBM databases, such as DB2 and SQL-DS, and EDA/SQL for connecting to other databases.

"IBM realized we had millions of dollars invested in heterogeneous data access technology and didn't want to duplicate our efforts," Senor said.

While IBM helped give birth to EDA/SQL, the tool has now taken on a life of its own and moved beyond the confines of the mainframe-centric Information Warehouse strategy.

Earlier this month, for example, IBI announced EDA/SQL support for five Unix platforms, giving users the option to use a scalable Unix processor as a data access hub rather than an expensive, proprietary mainframe (see "IBI sees Unix at center of data models," page 28).

IBI is also intent on meeting an ambitious, two-year, two-phase development plan designed to make EDA/SQL the industry's premier data access tool.

The aim in Phase One is to build EDA/SQL support into almost all client and server platforms. "We need to add support for 15 to 20 more server platforms and the same number of client applications before we fin-

(continued on page 28)

Battle brewing over distributed databases

Two-phase commit and replication face off in fight for best method of doing database updates.

By Timothy O'Brien
West Coast Bureau Chief

Just as users are beginning to examine the feasibility of implementing distributed applications over corporatewide networks, a controversy has emerged over the best way to handle updates in a distributed database environment.

Although it might seem like purely a database matter, network reliability is at the heart of the debate. While users face a growing need for timely and reliable access to distributed data, today's heterogeneous networks are complex and susceptible to downtime — which poses problems for any distributed database technology.

For years, the leading database companies have worked to provide a two-phase commit capability. Under two-phase commit, all databases across the network must be able to handle an update before it can be committed. If a single database cannot be updated due to a network failure or some other problem, the transaction does not occur.

Two-phase commit requires an extremely high degree of network availability to function and, thus, has been called the all-or-nothing protocol.

Cincom Systems, Inc. is planning to offer a modified two-phase commit capability that makes some provision for network failures (see "Cincom eyes new 2-phase commit plan," *NW,* Dec. 14). Software AG of North America, Inc., Sybase, Inc. and some other vendors are offering users an alternative to two-phase commit known as replication, which calls for the periodic replication of data across databases.

With the recent announcement of its Replication Server, which is expected next year, Sybase believes it will be able to offer users a way to continue operations during a network failure. In Sybase's plan, after a network problem has been fixed, replication will automatically synchronize data on machines across the network.

Replication promises to prevent a failure at a single site or machine from stopping updates at other locations and may help to minimize net traffic, as well.

"There is a place for both. But at this stage, two-phase commit is not very practical due to the cost required to ensure those types of transactions can take place," said Richard Finkelstein, president of Performance Computing, Inc., a Chicago database consulting firm. "Replication fits the business model better and is easier to deploy."

"Two-phase commit is overkill for some applications," Rymer said.

▲▲▲

John Rymer, vice-president of Patricia Seybold Office Computing Group in Boston, agreed.

"Both are necessary, but two-phase commit is overkill for some applications," he said. "Replication gives users more options since not all distributed applications will require ironclad control of every update."

While Sybase has offered two-phase commit capability for years, it is now clearly putting a premium on replication. That contrasts with market leader Oracle Corp., which uses two-phase commit as the basis for distributed updates in the latest release, Version 7, of its database.

Oracle Chairman Larry Ellison believes Sybase is trying to cloud the distributed database debate, adding that Sybase's replication capability is no more than "a few pieces of paper and some slides" at this stage.

"The whole argument is ludicrous," he said. "Sybase's programmable two-phase commit is so difficult, no one uses it. So now Sybase has backed off two-phase commit and is pushing replication. In the meantime, Oracle has introduced an automatic, trans-

(continued on page 50)

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IBM

EDA/SQL leads data access pack

continued from page 25

ish Phase One," Senor said.

Phase Two of the plan is to further boost the capabilities of EDA/SQL to support high-volume distributed processing in a heterogeneous environment. EDA/SQL already allows users to query and update data sources on a single remote platform. It also supports commit/rollback and record-level locking functions to ensure the integrity of remote updates.

Version 3.0 of EDA/SQL, due out sometime next year, will take these distributed capabilities one step further by allowing users to issue an SQL query that extracts information from multiple, distributed data sources, Senor said. EDA/SQL will automatically join tables of distributed databases — both relational and non-relational — and present the requested information to the user.

The next version will also support location-independent routing, a key feature in doing distributed queries and updates. This means developers will be able to build distributed applications without having to know the addresses of remote servers and databases and how to route messages there.

Instead, EDA/SQL will support a distributed catalog that contains all addresses and routing information needed to connect clients to back-end data stores.

IBI also plans to offer capabilities that would harmonize security procedures across multiple databases. Often, users have different passwords for each database they are authorized to access.

Senor said IBI plans to offer a distributed security feature, which he would not detail, that would resolve problems caused by heterogeneous security mechanisms when performing distributed queries or updates.

Finally, IBI plans to speed up the rate at which EDA/SQL completes SQL transactions. "Our goal is to execute SQL transactions against any relational or non-relational database as fast as vendors can achieve with their proprietary or native SQL access methods," Senor said.

IBI sees Unix at center of data models

Information Builders, Inc. (IBI) no longer believes the mainframe will be the primary hub within users' data architectures.

John Senor, vice-president of IBI's Enterprise Data Access (EDA) Division, thinks Unix processors will take on that role (see graphic, page 25).

"We are beginning to see the emergence of a network-centric data model in which Unix machines serve as intermediate hubs for storing local data and providing access to data repositories on remote Unix or mainframe servers," Senor said.

The Unix hubs are cheaper and more scalable than mainframes and provide greater flexibility in the design of enterprisewide data architectures, he said.

A network-centric model lets users store data closer to client workstations that use it, minimizing network traffic and potential bottlenecks, according to Senor. For example, users can extract host data and stage it on a Unix hub located closer to end users.

In fact, users can replace a single, monolithic mainframe hub with multiple intermediate Unix hubs that can interact with each other and the mainframe across an enterprise network to optimize data access and storage.

However, Senor is careful to say that the mainframe-centric data model offers plenty of benefits. After all, IBI's industry-leading EDA/SQL tool was developed to support IBM's mainframe-centric Information Warehouse strategy for linking data resources throughout an enterprise.

"Information Warehouse provides everything you need to know to implement a large-scale, long-term data architecture," Senor said. "It has many adherents."

While IBI is still committed to the Information Warehouse, the company clearly is gearing up to provide products and services that support a network-centric view of both data storage and access.

Earlier this month, for example, IBI announced five new EDA/SQL Servers based on Unix platforms from Sequent Computer Systems, Inc., Pyramid Technologies, Inc., Digital Equipment Corp., NCR Corp. and Data General Corp. EDA/SQL already runs on Unix servers from IBM and Sun Microsystems, Inc.

The Unix-based EDA/SQL Servers have a routing feature that enables them to redirect user requests for data to other EDA/SQL servers elsewhere on an enterprise network.

It is clear that these Unix EDA/SQL Servers form the basis of the network-centric data model that IBI believes will become an industry norm.

— *Wayne Eckerson*

AT&T changes stand on resale

continued from page 21

For example, the FCC did not examine whether Canada offers comparable interconnection from a technical standpoint for U.S. carriers or whether access arrangements are equivalent, AT&T said. AT&T complained that the U.S. is allowing fONOROLA and any other foreign carrier that is approved to resell international switched services to interconnect to international private lines directly at the central office of U.S. carriers.

Such direct connections are not allowed in Canada, AT&T said. Instead, resellers there have to purchase WATS lines from the Canadian carrier consortium Stentor to connect between the reseller's switch and the international private line.

In addition, AT&T said if Canadian access arrangements are not priced out the same as in the U.S., it could cause big deficits to be run up between the U.S. and Canada.

AT&T also said one of the FCC's main reasons for allowing resale of switched services over private lines may be a faulty one. The commission said it believes that if users have an option of routing international switched traffic over either the public switched network or a private line, the competition will help drive down prices that remain high in some countries.

> "The risk to U.S. consumers if the traffic diversions do not fall equally is great."
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But AT&T said there is no evidence that competition for switched traffic carried over private lines will help bring down prices. "Whether international resale will exert competitive pressure on foreign carriers to drive accounting rate reductions toward cost . . . is unknown and untried," the carrier said.

Even worse, the new policy could lead to a lopsided bypass of the public switched network if more users on one country's side of an international link decide to place switched traffic on private lines than do users in the other country, AT&T said. "The risk to U.S. consumers if the traffic diversions do not fall equally is great," AT&T said.

Carrier gets green light

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gives them a choice about when their phone numbers will be delivered."

Southwestern Bell said it will offer in both states free per-line blocking to domestic violence and law enforcement agencies that request the feature. With per-line blocking, every telephone number is blocked.

Southwestern Bell already offers caller ID in 15 communities in northeastern Oklahoma, including Tulsa, where the company introduced it in September. The company has filed for permission to offer caller ID in Missouri and Texas.

"After only three months, nearly 3% of the customers in this area subscribe to caller ID," Wilder said. "That's far beyond our initial expectations."

In Arkansas and Kansas, Southwestern Bell will charge residential customers $6.50 a month for caller ID and business customers $8.50 a month. Subscribers must purchase the display devices separately.

Regulatory Update

contnued from page 21

information about employees who were responsible for ordering telecommunications services.

AT&T also asked the users to provide information on any bills they disputed prior to filing the complaint as well as whether they dispute AT&T employee affidavits claiming that the users were briefed on configuration options.

The **New York State Board of Regulatory Commissioners** has approved a $1.5 billion plan by New Jersey Bell Telephone Co. to replace its statewide network with an all-fiber network by the year 2010.

The move is expected to accelerate the emergence of a wide array of high-bandwidth applications, such as distance learning, imaging, remote host access and videoconferencing.

In exchange for approval of the plan, New Jersey Bell agreed to a seven-year freeze on its basic residential rates as well as charges for two less expensive services aimed at low-income customers.

Increases for other services would continue to be subject to the regulators' current review process. After 1999, regulators and New Jersey Bell are to develop a new rate schedule.

New Jersey Bell expects to finance the first part of the massive networking project by paying lower dividends to Bell Atlantic Corp., its parent company, and by investing the retained earnings in the network.

MCI fights AT&T over technology

continued from page 21

fringing the four patents, which AT&T claims to hold exclusively. MCI claimed that even if AT&T could prove it holds the patents, the court should stop AT&T from enforcing them due to deals it struck at the time of divestiture.

When U.S. District Court Judge Harold Greene was drawing up the Modified Final Judgment that split AT&T from the local Bell companies, he asked AT&T whether it held patents on any technology that could impede competition, and AT&T said that it did not, according to MCI's filing. According to MCI, AT&T intentionally withheld information about the four patents in question from the court and Department of Justice.

"Despite its repeated prior representations to [Greene's] court that AT&T did not control any technology needed for effective interexchange competition, AT&T now claims a monopoly over enhanced 800 services and other critical aspects of running an efficient long-distance network," MCI stated.

MCI complained most strenuously about AT&T's conduct on the patent regarding database lookup of 800 numbers.

"AT&T has advised customers that they risked service interruptions if they purchased enhanced 800 services from competitors that were not licensees of the [AT&T] patent," MCI told the court. "Unless restrained, AT&T will continue to make false representations regarding the existence and effect of the patent to third parties with resulting injury to competition in the long-distance market."

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

Sales of advanced voice processing equipment, such as interactive voice response and voice recognition systems, in the U.S. will more than triple from $700 million in 1991 to $2.5 billion in 1998, according to a new study from Market Intelligence Research Corp., a Mountain View, Calif., market research firm.

People & Positions

Xylogics, Inc., a Burlington, Mass., vendor of communication servers for Unix networks, has announced that **Bruce Bergman** will step down as president and chief executive officer by Oct. 31, the end of the company's 1993 fiscal year.

He will remain on Xylogics' board of directors but will look to head up another computer or network firm. He will be replaced by **Bruce Sachs,** who was recently named executive vice-president.

Xylogics also named **Rich Boule** as vice-president of engineering, filling a void left by Sachs' promotion. Boule comes from Proteon, Inc., where he was senior director of technical marketing.

NetWorth, Inc., a Dallas wiring hub vendor, has named **Mark Calkins** vice-president of marketing, effective Jan. 4. Calkins, who was vice-president of marketing at Novell, Inc. for five years, will support NetWorth's focus on Novell NetWare nets. He replaces **Martin Lattman,** who will now serve as vice-president of marketing operations.

Verilink asks FCC to review stance on T-1 line build-out

Wants carriers to be able to offer it as a service.

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — Verilink Corp. has petitioned the Federal Communications Commission to change its rules and allow carriers to provide line build-out for T-1 equipment as a regulated transmission service, a move that could save users money and installation headaches.

Currently, users installing customer premises equipment must adjust the equipment's output signal power themselves for line build-out to the carrier network. Verilink told the FCC that if carriers were allowed to provide line build-out as a service for T-1 equipment, users would be spared the installation problems that often require manufacturer assistance.

"Responsibility to choose among multiple line build-out settings has given rise to a joint engineering procedure whereby CPE customers must seek assistance from manufacturers," the company stated in its petition to the FCC in mid-December.

"Even though product manuals provided with equipment typically include explicit instructions, users often do not follow the instructions or do not interpret the instructions accurately," Verilink said. "This is occurring more frequently as T-1 circuits are being deployed more often to smaller businesses [which may be driven, in part, by declining T-1 tariff rates]."

When users inadvertently introduce excessive signal power into the network, they create disruptions, such as cross-talk, which can also interfere with other users. The cost to resolve these problems can be as high as $40,000 per user site, Verilink noted.

Changing the FCC rules would simplify installation of customer premises equipment since users would be able to order line build-out as a service. Carriers could not justify charging high rates for the service because they already use line build-out for other purposes, including loopback, ac-

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INDUSTRY BRIEFS

Cabletron posts 3Q numbers. Cabletron Systems, Inc., a Rochester, N.H., wiring hub vendor, has posted third-quarter revenue of $110.4 million for the period ended Nov. 30, up 42% over the corresponding period last year. Third-quarter earnings totaled $22.1 million, up 44.4% from $15.3 million in last year's third quarter.

IBM, Harris team on federal business. IBM and Harris Corp. have agreed to work together under a marketing and technology alliance to sell to the federal marketplace.

The two companies will jointly market the Harris Night Hawk Computer System used in simulation, telemetry and secure computing applications with IBM's RISC System/6000 in a secured client/server configuration to U.S. government customers.

BroadBand, Dodge nab funding. BroadBand Technologies, Inc., a Research Triangle Park, N.C., vendor of fiber-in-the-loop equipment, has closed a fourth round of venture financing worth $18 million. So far, BroadBand has raised $45 million.

New investors include Allstate Insurance Co. through its venture capital division, BEA Associates, Hughes Aircraft Co. and T. Rowe Price. Earlier investors, including Accel Partners, also participated in this round of funding, which will be used to support volume deployment of BroadBand's Fiber Loop Access System in telephone networks.

"Networking is the single hottest investment market today, and internetworking has been the hottest part of the net market."

Paul Deninger
Managing director
Broadview Associates, L.P.

Analyst forecasts net trends for '93

Predicts future will be ripe for next-generation technology, acquisitions, client/server computing.

Q&A The year 1992 was filled with mergers, acquisitions, alliances, start-ups and initial public offerings in the net industry. There were some blockbuster transactions, such as AT&T's proposed partnership with McCaw Cellular Communications, Inc., a host of alliances in the internetworking market, as well as initial public offerings from Banyan Systems, Inc., Chipcom Corp. and others.

To get a feel for what 1993 promises for the network industry, *Network World* Senior Editor Bob Brown interviewed Paul Deninger, a managing director at Broadview Associates, L.P., a Fort Lee, N.J., mergers and acquisitions firm serving the information technology industry.

How would you characterize the investment climate in the network market?

The investment climate is very strong. Networking is the single hottest investment market today, and internetworking has been the hottest part of the net market.

One of the financial services firms recently put out an index of [year-to-date] stock market performance for all industries in America, and the No. 1 performing sector was communications equipment. Number 88 — dead last — was computer equipment, which I think says a lot about the investment climate.

People are less concerned about computing because its technology curve is getting very steep, very fast, and processing technology is no longer the gating factor to [distributed] information processing. The gating factor is now internetworking and communications. Hence, both the public market and venture capitalists are anxious to invest in those kinds of companies.

What types of transactions do you expect to see in the internetworking market?

Companies like Cabletron [Systems, Inc.], Cisco [Systems, Inc.], Wellfleet [Communications, Inc.] and SynOptics [Communications, Inc.] will begin to think about acquisitions, where to date, they have mostly been involved in alliances. They have made a good decision not to focus on acquisitions because their organic growth has been so extraordinary.

Managing that growth, in and of itself, is an enormous management task. But now they are in leadership positions, and they are sitting on high-price stocks that give them good currency to do transactions.

The second type of transactions will come from companies in markets like transmission products, adapter cards and point-to-point connectivity products. They have established distribution channels, market presence and a customer base. They are going to be buying into next-generation technology because they don't have the growth in their markets that the markets they are investing in have. A deal like the [Standard Microsystems Corp.-Sigma Network Systems,

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Analyst forecasts net trends for '93

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Inc.] transaction or the Newbridge [Communications Corp.] investment in [Advanced Computer Communications] is representative of that kind of a transaction.

[SMC, a vendor of adapter cards and low-end hubs, recently announced plans to buy Sigma, a switching hub vendor, while Newbridge, which makes multiplexers and other data communications gear, recently bought a chunk of ACC, which makes routers and bridges.]

How will IBM, Digital Equipment Corp. and some of the struggling computer players fare in this area?

The computer firms are tied down in getting their ships in order. When you are bailing as much water as they are, you are not thinking about rigging the next sail.

What can we expect from other network market segments, such as telecommunications and software?

In telecommunications, we're seeing consolidation of a slow-growth market. The Sprint-Centel [Corp.] deal is an example. I think there will be a considerable shake-up in companies that supply telecom companies. Their only path to growth is the private network business, and even that market isn't exploding.

As for software, the big trend driving the network market in '92 was client/server computing. As a result, the companies that have tools for development and implementation of client/server database and mail-enabled applications are attractive to buyers. I'm thinking of companies like Powersoft Corp.

Is there much money in the investment and venture capital community available now for investing in the network industry?

Absolutely. But having said that, if you are a small company and you think you are going to get venture capital to build a hub, you can forget it. Venture capitalists are not going to make the mistake they made in pen-based computing or years ago in spreadsheets and IBM PC clones, where every venture capitalist had a PC clone manufacturer in its portfolio, and then there are hundreds of them. In fact, there are going to be one or two fewer hub vendors at the end of '93 than there are now.

What kinds of companies are investors interested in?

Some of the hot things are [Asynchronous Transfer Mode], wireless, digital video and multimedia. There is a belief that high-bandwidth applications are going to happen, so there is a need for tools to build them and equipment for transporting those applications and management tools.

How much influence will users have over the kinds of deals their vendors make?

Any move to make an acquisition is a customer-driven decision. A truly strategic acquisition is one that is part of a make vs. buy decision. The reason you are even in discussions is that you believe your customers need the product.

How do you think 1993's merger and acquisition activity will compare to this year's?

I think there will be a lot of activity next year because the basic technology continues to move rapidly and the product life cycles continue to shorten. Also, the hot public market, which has allowed a lot of companies to go public, has enabled firms like Proteon [Inc.], Chipcom and CrossComm [Corp.] to raise a fair amount of capital. Those types of companies are going to be looking to deploy that capital.

Verilink asks FCC to review line build-out

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cording to Verilink.

The firm said a rule change would be consistent with a new ANSI T1.403 standard that calls for a single output pulse level for all equipment interfacing with the network, thus eliminating the requirement for line build-out functionality in customer premises equipment.

"Verilink strongly believes that network provisioning of line build-out will have no material impact on competition in the CPE market," Verilink said.

While the cost of customer premises equipment is not expected to drop significantly under the proposed new rule, "it will significantly improve customer perception of service and channel service unit equipment," the company said. "The requested rule changes will in no way impede a customer premises equipment manufacturer's competitive position and will eliminate substantial inefficiencies and unnecessary costs."

Worth Noting

According to a recent report from International Data Corp., a research firm in Framingham, Mass., 56% of users across all industry sectors are planning to implement some type of wireless data networking application in the near future.

Manager Minutes

The **International Communications Association (ICA)** announced John Lynn has been appointed the new chairman of its Telecommunications Public Policy Committee (TPPC). Lynn, who is telecommunications counsel for Electronic Data Systems Corp.'s Office of Government Affairs in Washington, D.C., will direct the ICA's public policy activities at the state, federal and international level, according to the ICA.

Separately, the association announced it will offer a conference track at the upcoming ICA ComNet Dallas '93 show on current regulatory and legislative directions in the industry and other related activities of TPPC.

For more information, contact ICA at (214) 233-3889.

Business Research Publications, Inc. is sponsoring Access Charges II, the second annual conference on changes in access rate structures and their impact on competition in the local exchange and on interexchange carriers. The program will be held Jan. 30-Feb. 2 and will include a review of access charge restructuring and recent Federal Communications Commission decisions on access rates.

For more information, call (800) 822-6338.

Cruise line uses AS/400 net to ride wave of growth

Travel agents, suppliers, others brought on-line.

By Joanne Cummings
Senior Writer

MIAMI — Royal Caribbean Cruises, Ltd. (RCC) foresees smooth sailing with a new wide-area network anchored by several of IBM AS/400 minicomputers, a system that supports links to suppliers, affiliated booking offices, airlines and more than 15,000 travel agencies using a variety of networking protocols.

Faced with fast growth in the late '80s, the billion-dollar cruise line evaluated several options for a platform that would carry it into the next century. After looking at IBM mainframes, Digital Equipment Corp. systems and several Unix platforms, RCC decided on the Application System/400.

"You can program things much faster on the AS/400 than you can on the mainframe, and you can do it with fewer people," said Ronald Sieman, vice-president of information technology at the company.

> "Once we have Apollo in place, we'll be tied to 25,000 agents," Sieman said.
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"Once you start looking at the different Unix packages, you have to spend a great deal of time evaluating them and you have to grow staff to know them," he said. "That adds up to a fairly significant expense. My feeling is that the total cost of ownership in our case is going to be equivalent to or better than in the Unix world — all costs considered."

RCC now has four AS/400s supporting three distinct lines of business. Two of the machines support what the company calls its Passenger Services applications. Sieman said that when the next AS/400 model is available, the functions of these two machines will be combined on the larger box.

One of Passenger Services AS/400s is used to keep an inventory database of the cruise line's cabins and an X.25 link to the company's London booking office, enabling domestic and overseas offices to reserve cabins in real time.

"In the past, London had to work off of monthly allocations of inventory," Sieman said. "Managing that as we came close to a sailing was a real pain in the neck."

The system also supports links to Air Canada and Encore Cruises, which enable those companies to book RCC cruises for their customers directly, as well as links to an automated billing system and the cruise line's various banks to handle automated financial transactions.

A second AS/400 supports interfaces to four different airline reservation systems. "We are the first and only cruise line to offer this capability," Sieman said.

The links enable travel agents to use air reservation terminals to book RCC cruises. RCC connects to PARS, SABRE, System One and WorldSpan via a Systems Network Architecture link and a Series/1 communications controller. The cruise line is currently negotiating to support Apollo's reservation system. "Once we have Apollo in place, we'll be tied to 25,000 agents," Sieman said.

The third AS/400 has an SNA link to IBM's Information Network, a value-added network it uses to communicate with ships at sea via satellite.

Ships can use the links to make requests, such as for food or hotel items. Those requests are fed into the AS/400, which in turn communicates them to RCC's various warehouses. The warehouses send the requested items to the ship's nearest port and transmit a confirmation to the AS/400.

The fourth AS/400 is utilized mainly for application development purposes, Sieman said.

In the first quarter of next year, RCC will be rolling out a new application in which RCC agents booking a cruise can take passenger information, such as name and address, and enter it automatically into airline reservation systems, avoiding the need to rekey information for ticketing the passenger, Sieman said.

"That's very manually intensive today," he said.

Jan Scites: Facing the future headfirst

Connecticut Mutual VP sees business process redesign as opportunity to set pace for industry.

By Alison Conliffe
Assistant Features Editor

Whether speed walking, biking or directing business process redesign projects, Jan Scites has her finger on the pounding pulse of the fast-approaching future.

Scites also has the good fortune to be in a position where she can make a difference at Hartford, Conn.-based Connecticut Mutual Life Insurance Co. She is moving the company ahead on a course that few others have taken — namely business process redesign.

Promoted in June to senior vice-president in charge of Connecticut Mutual's individual life insurance business unit, Scites describes the relationship with her employer as "a match made in heaven."

"Even though we're faced with tough times, this is one of the greatest opportunities — to have a sense of accomplishment, to help us better survive and to set ourselves up for the future," Scites said.

Business process redesign, also called reengineering, involves applying technology to improve or streamline business processes. Network technologies, such as client/server and group collaboration, are key in business process redesign because they enable end users to share information quickly and easily.

Scites achieved recognition primarily as the leader of a project to develop an enterprisewide client/server architecture. The company implemented 600 token ring-attached IBM Personal System/2s running Microsoft Corp.'s Windows 3.0, as well as local applications and other software tools that provide transparent access to host applications and a Unix-based image system. By tailoring each PS/2 to retrieve only data needed by its user, the company succeeded in cutting the time it takes to complete certain tasks from days to seconds.

Projects led by Scites have obtained finalist status in the International Communications Association's Call For Innovation and the American Management Systems/Carnegie-Mellon University's Fifth Awards for Achievement in Managing Information Technology.

Scites brought business process redesign expertise to Connecticut Mutual from Phoenix Equity Planning Corp., where she served as president. After a childhood spent in Delaware, Ohio, she graduated from Ohio University and earned her law degree from the University of Connecticut Law School.

And how did an attorney embroiled in the challenge of raising two teenage daughters get where she is? "I love to be in situations where I am challenged and excited about what I'm doing," Scites said.

Although she knows a lot about technology, Scites does not consider herself a technologist, but a businesswoman. She considers business process redesign to be a business strategy, not a purely technological one.

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OPINIONS

RIDING THE AIRWAVES

BY IRA BRODSKY

Outdated mgmt. schemes account for spectrum shortfall

Users are told the only way to make room for personal communications service is to take radio spectrum away from someone else. But establishing new radio services shouldn't require robbing Peter to pay Paul.

The current frequency shortage is not the result of demand exceeding supply. Rather, it is due to inefficient and outdated spectrum management policies that have long been influenced by technology pessimists. Congress was first told we ran out of radio spectrum in 1925 when the National Association of Broadcasters said all freqencies above 1 MHz were useless. So, Congress allocated spectrum over the 1-MHz band to ham radio operators, thus protecting broadcasters from potential competitors in their part of the spectrum. However, frequencies above 1 MHz were eventually found to be useful. Today, frequencies as high as 30 GHz are used in industrial applications. Frequencies 10 times higher than that are used by the military.

Technology advances keep paving the way for the same radio spectrum to support even greater capacity. Cellular radio combines computer networks and low-power transmitters to enable a single frequency to be used in a greater number of geographical areas. Digital radio techniques, such as Time Domain Multiple Access, stuff about about six times more information into a channel than analog radio techniques.

Similarly, market forces should have freed up large portions of the spectrum long ago. Television broadcasters, for example, continue to guard underutilized UHF allocations, despite the explosive growth of alternative media such as cable TV.

The Federal Communications Commission should take steps to ensure more efficient use of the radio spectrum. It should place greater emphasis on unlicensed services, which eliminate or minimize interference by using low-power transmitters; radios that transmit only when granted permission by a network; or proposed intelligent radios that would enable many users to orderly and equitably share the same channel.

Adjusting FCC rules to accommodate spectrally efficient technology would squeeze more channels out of a given radio band. Often, 25-kHz channels could be split into 12.5-kHz or even 5-kHz channels, more than doubling the number of users that could be served. Also, auctioning off spectrum would ensure that users take only as much bandwidth as they need. There's enough spectrum to go around as long as prices reflect what the market will bear.

To its credit, the FCC has been moving forward on each of these fronts. But it is unclear whether President-Elect Bill Clinton will continue these vital reforms. Let's hope the new administration is not swayed by people who want to bar potential competitors from the radio spectrum under the guise of "managed competition" schemes, but rather by those who recognize that only a continual infusion of innovative technology will ensure the ongoing growth of spectrum capacity.

Brodsky is president of Datacomm Research Co. in Wilmette, Ill. He can be reached via radio at his Internet address: brodsky@radiomail.net.

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EDITORIAL

Wishing for open systems is not enough; it's time to act

In what's become a holiday tradition here, every year we query a number of readers from across our industry and ask what they want Santa to bring them for Christmas. This effort is tongue-in-cheek, to be sure. But it highlights an ongoing concern. Almost to the word, we find users asking for the same thing year after year — open, interoperable products.

In an industry where technologies seem to advance by light years on a weekly basis, we find it hard to believe that greater progress toward resolving lingering interoperability problems could not be achieved in the past five years.

The concept of open systems is fairly simple to grasp and a logical one for users to voice. Because networks have become so complex and include a wide variety of equipment from several vendors, a user's top concern is making sure that everything can communicate with everything else with a minimum of cost and aggravation. But for that to come true, vendors must comply with standards, abandon their proprietary view of the world and work more closely with each other to ensure interoperability of technologies.

There has been progress, but the process is moving very slowly. Despite preaching the company line that compliance with standards and open systems are high on their priority list, vendors are in business to make money. The belief is still prevalent that it's easier to do that by pitching your own stuff instead of adding value to standards-based technology.

Users must also shoulder some of the blame. They need to drive this industry and be the agents of change. That means setting up detailed procurement policies that won't allow purchases of any equipment that isn't open. It also means implementing migration plans for moving from where they are today to a true open systems environment, and, once there, living by those standards.

Quick response by vendors to users' demands and commitment by users to open, interoperable products could really drive change as well as open the door to some new requests on 1993's holiday wish list.

OPINIONS

THE BLUE VIEW

BY ANURA GURUGE

The stage is set for IBM networking to come of age

It may not be apparent yet, but IBM's networking attitude and methodology changed fundamentally and decisively in 1992. IBM is promising to deliver open, tightly integrated, high-speed, multiprotocol, multivendor networks that will be easy to use, implement and manage.

Such utopian objectives may sound trite and smack of pure hype to networking cynics who are used to being misled and disappointed. However, IBM is deadly serious and wholly committed to this goal. Moreover, it intends to get some of the prerequisite tools for implementing this new generation of networks in place in 1993.

IBM's 1992 announcements and product introductions shed considerable light on how this networking vision will be brought into focus. Key products IBM introduced in 1992 were: the 6611 Network Processor, its multiprotocol bridge/router; the RouteXpander/2, the 6611's sidekick designed for branch office applications; Advanced Peer-to-Peer Network software for mainframes; and frame relay data communications equipment support on 3745 front-end processors.

But the most important announcement IBM made in 1992 came when its Networking Blueprint was unveiled. The Blueprint is the overall umbrella strategy for IBM's new generation of networking and will enable users to receive a new set of applications that fully exploit the processing, storage and presentation capabilities of programmable workstations.

These applications will make use of the cooperative processing, peer-to-peer, program-to-program, client/server paradigm IBM has been talking up for some time. They also happen to be the justification for APPN. If the applications use LU 6.2, they will be able to enjoy the value-added facilities offered by APPN.

The Blueprint defines a set of application program interfaces and network services developers can use to build network-independent applications. The Blueprint also defines a Common Transport Semantic (CTS) technology, which functions at Layer 4 of the Open Systems Interconnection model and performs network service-to-network type transformations.

> The most important announcement IBM made in 1992 was its Networking Blueprint.
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This very contemporary methodology enables Blueprint-compliant applications to run over APPN, Transmission Control Protocol/Internet Protocol or OSI networks. For a short time, Blueprint-compliant applications can also run over local-area networks using Network Basic I/O System or Novell, Inc.'s Internetwork Packet Exchange. Thus, the same application could run across different network types at different sites.

CTS will be the basis for another transformation service that will enable an application running on an APPN network to communicate with a partner application running on a TCP/IP net. This will at long last give users a truly flexible open net.

This all sounds dynamite in theory, but what really counts is whether IBM will be able to deliver on this promise. Systems Application Architecture is a nagging reminder of the potential for a yawning chasm between theory and practice at IBM. Hopefully, IBM will do the right things this time around.

It seems IBM is taking some of the right steps. The workings of CTS, in the form of a Multiprotocol Transport Network (MPTN) specification, have been submitted to X/Open Co., Ltd. as well as the OSI Implementors Workshop for adoption as a standard. There is also at least one third-party software developer, Ki Research, Inc. of Columbia, Md., working on MPTN-based applications.

IBM intends to provide CTS-based, multiprotocol network access functions across its strategic computing platforms. With luck, mainframe- and OS/2-based implementations of CTS will be available in 18 months.

If this all sounds like pie in the sky, just remember that in 1992 we saw CICS, the bastion of IBM host application subsystems, implemented on top of Unix in the IBM RISC System/6000, as well as on Hewlett-Packard Co. minicomputers. Furthermore, CICS transactions, the epitome of Sytems Network Architecture interactions, can now be conducted across TCP/IP nets.

It has taken 19 years, but IBM networking is now set to come of age. ◘

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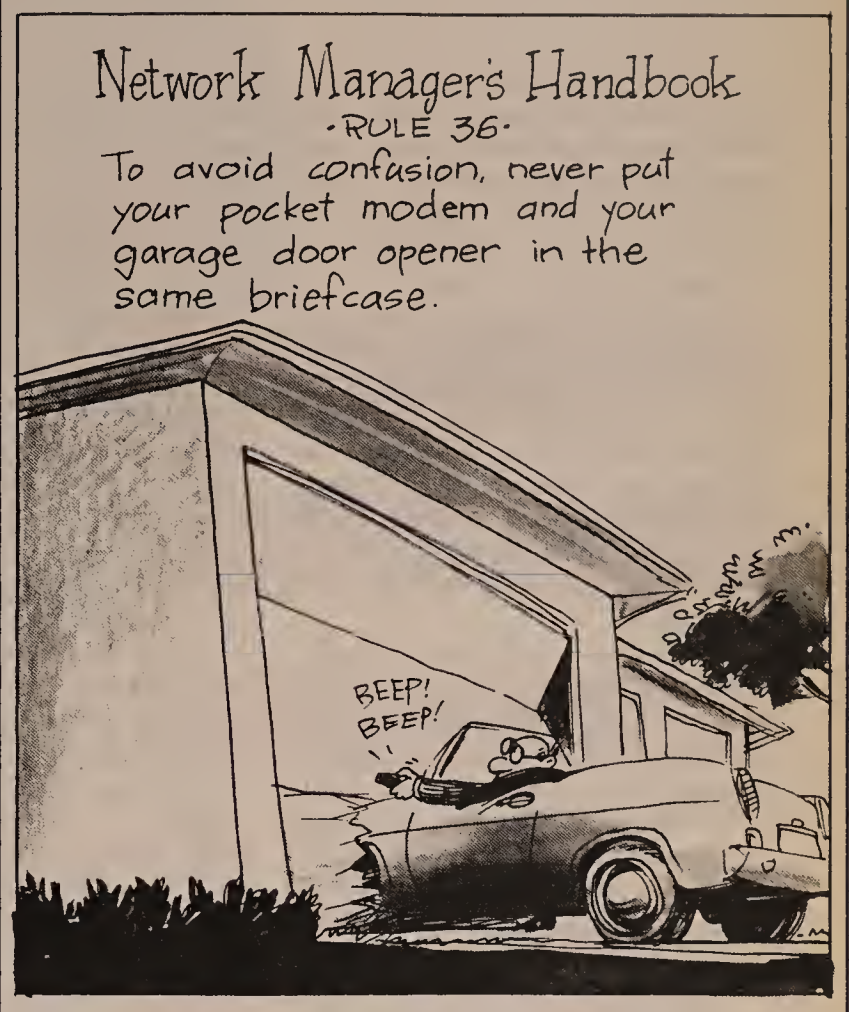
TELETOONS

BY FRANK AND TROISE



LETTERS

Router results omitted

We were surprised the article reporting the results of router performance tests by Scott Bradner at Harvard University's Network Test Device Lab ("Router vendors take Harvard midterms," *NW,* Nov. 23) omitted key ratings for the IBM 6611 Network Processor.

Specifically, measurements for routing packets between Ethernet local-area networks over a T-1 circuit, between IBM Token-Ring LANs over a T-1 circuit and for source route bridging over a T-1 circuit were left off the accompanying chart.

It's unfortunate because the article doesn't clarify the IBM router's solid support for these key requirements. The 6611 can route traffic at full media speed — in all these cases.

K.A. Siedler
Director of networking product marketing
IBM
White Plains, N.Y.

Editor's response: IBM did indeed participate in each test suite, but its results were inadvertently omitted from the information furnished for the story.

In the Ethernet-to-Ethernet via T-1 wide-area network test, the 6611 had a packet forwarding rate of 2,975 packet/sec for 64-byte packets and 106 packet/sec when forwarding 1,518-byte packets.

In the Token Ring-to-Token Ring via T-1 WAN test, the 6611 had a packet forwarding rate of 3,123 packet/sec for 64-byte packets and 90 packet/sec for 2,048-byte packets.

In the same test, the 6611 was able to perform source route bridging at a speed of 2,603 packet/sec and 90 packet/sec for 64- and 2,048-byte packets, respectively.

We regret that this oversight occurred. ◘

Want to respond to an article or opinion in Network World? *Mail typed letters to Editor,* Network World, *161 Worcester Road, Framingham, Mass. 01701, or fax them to (508) 820-3467. Transmit your response via MCI Mail at 390-4868 or to our Bulletin Board System. (See page 2 for BBS instructions.) Letters may be edited for space and clarity.*

Building a better network

By PATRICIA COPE

Design and optimization tools come to the aid of net managers pressed to improve performance, sketch out upgrade paths.

As the strategic value of interconnected LANs continues to grow, network managers are under intense pressure to devise a battle plan that ensures network performance objectives are met and upgrades are executed in a smooth cost-effective manner.

Increasingly, network managers are turning to network design and optimization software tools to accomplish this task. The tools enable managers to design networks from scratch, figure out how well existing nets are performing, identify potential bottlenecks and predict the effect new resources, users or network configurations will have on performance.

Running on a variety of platforms, including Unix-, Microsoft Corp. Windows- or Apple Computer, Inc. Macintosh-based workstations and Digital Equipment Corp. minicomputers, these tools include high-powered packages that do network modeling and simulation as well as basic programs that map out and document a physical network configuration.

High-end packages are essentially complex programming environments that enable users to model and simulate networks. With these packages, users assemble a model with a series of user-defined or predefined software modules that represent physical and logical network elements such as workstations, network protocols and traffic.

In order to see how that model would perform, users run it through a simulation process. To get a simulation going, users define the level of performance they want to measure, such as maximum end-to-end delay during a specified period of time. This measurement becomes a dependent variable.

The simulation will then show what effect independent variables — such as the number of users, the network protocols used, or the characteristics of different bridges or routers — will have on the dependent variable. Independent variables are often changed to see what new effect is caused on the dependent variable.

Because high-end tools require a high degree of programming skill, they are commonly used by network and software engineers to model and simulate new network protocols, hardware devices or network designs.

Some examples of high-end tools are CACI Products Co.'s Network II.5 and Comnet II.5; Comdisco Systems, Inc.'s BONeS Designer; MIL 3, Inc.'s Optimized Network Engineering Tools (OPNET); and Scientific and Engineering Software, Inc.'s Workbench.

Simpler versions of these complex tools are now becoming available. Based on object-oriented programming, the new tools have plug-and-play software modules that represent generic physical and logical network elements. These objects can easily be modified to closely approximate a user's unique network elements.

The new tools are positioned as performance analyzers that, among other things, help net managers isolate potential bottlenecks and cost-justify the purchase of new equipment that will improve performance (see "New tools ease task of network analysis," this page). Comdisco's BONeS PlanNet is the first such tool to reach the market. Early in 1993, CACI is expected to release Comnet III, a combination of its Lannet II.5 and Comnet II.5. MIL 3 plans to introduce OPNET Analyst in 1993 and rename its current OPNET product OPNET Modeler.

At the low end of the market are packages that enable users to design cabling plants for such common network types as token ring or Apple's AppleTalk net. Some low-end packages also enable users to document the design and create wiring scheme maps. Architecture Technology Corp.'s Token Ring Cabling System Planner is an example of such a product.

While most high-end modeling and simulation packages currently enable users to manually feed data into network models, the majority of vendors are building links that will allow their products to import data directly from protocol analyzers. This lets users create more accurate net models with a lot less work.

Many vendors are also beefing up the presentation capabilities of their products by including support for real-time and recorded animation, which lets managers see full-motion graphical depictions of how the network will operate.

Including predefined modules in high-end modeling and simulation packages is also a relatively new trend. Until recently, users had to create modules from scratch. Consequently, users could represent almost everything on the network in their models as long as they had enough programming skills to create the modules.

Model building

For example, Advanced System Technologies, Inc.'s (AST) Quantitative Aided Software Engineering RT/s (QASE RT/s) enables users to build modules that represent custom-developed or off-the-shelf software packages. These modules can be used to see how well the packages will run across a network of specific hardware systems.

To make their packages somewhat easier to use, high-end vendors are providing predefined modules that describe the generic attributes of such hardware devices as computer processors, storage devices, bridges and routers. These packages also include modules that mimic certain types of traffic such as bursty data flows, application transactions and correlated traffic encountered in transaction processing environments.

However, users still need some level of programming skill to customize these generic modules to accurately reflect the specific type of hardware or traffic they have on their networks.

CACI and Comdisco provide large libraries of modules with redefinable default parameters, but the firms' modules differ in flexibility and detail. For the most part, CACI's modules are tightly defined and require little modification. However, advanced CACI users can develop custom modules using the firm's proprietary programming languages. Modules in Comdisco's BONeS PlanNet are more loosely defined, which requires users to know more about network operations in order to accurately set parameters.

New tools ease task of network analysis

Thanks to new, easier-to-use tools, network managers no longer need an engineering degree to model and simulate networks.

A new genre of modeling and simulation software consisting of plug-and-play modules lets net managers build network models by placing icons representing various network components, protocol stacks and traffic loads on a workstation screen.

Lines representing network links can be drawn to connect these icons together and network operation can be simulated to see how the model would perform.

The new products enable net managers to modify models to predict the effect various designs or usage patterns would have on network performance.

For instance, users can change the number of nodes, types of workstations on the net and traffic patterns.

Colin Mick, technical manager for Comdisco Systems, Inc.'s BONeS product line, says there is a general process users can follow when using one of these new tools.

The first thing users should do is define the problem they want to solve and quantify the performance objectives they want to achieve.

Users then select the components they need to model the network — such as local-area network segments, bridges and routers — from a library of software modules and place them on the screen. Once on screen, users set operating parameters for each component in order to control their behavior.

The components are then linked together with lines.

Next, users set software probes to collect data describing the operation of the model during simulation and then save the model.

Before saving, most programs automatically check the model for design errors. Users then specify the amount of real-time operation that will be simulated. Longer periods generally give more precise results.

Users then run the simulation and can rest assured that the probes will store statistical data for later analysis. A program with a real-time animation feature lets users watch the simulation as it runs.

When the simulation is complete, users can examine the results. Some simulation tools will automatically generate plots based on the data collected during the simulation while others give users the ability to construct their own plots.

The cost of a simulation tool and the time needed to learn how to use it are easily offset by better network performance and less downtime.

— Patricia Cope

DESIGN AND OPTIMIZATION PACKAGES

Like other vendors' products, MIL 3's OPNET includes some detailed predefined modules such as those that describe the attributes of Ethernet, Fiber Distributed Data Interface, and Transmission Control Protocol/Internet Protocol networks. OPNET also remains flexible enough to enable users to customize those modules. The forthcoming OPNET Analyst will provide even more predefined modules.

MIL 3 is positioning OPNET Analyst as a capacity planning, cost-justification and performance analysis tool suited for managers with little programming skills. OPNET Modeler can be used by programmers to build modules used in OPNET Modeler or OPNET Analyst.

Some vendors include predefined modules supporting specific vendors' network devices. For instance, Make Systems, Inc.'s Netmaker has predefined modules that provide detailed descriptions of products made by Network Equipment Technologies, Inc.

Importing live data

Another emerging trend among high-end products is the development of links to third-party or proprietary protocol analyzers and network monitors, such as Network General Corp.'s Sniffer.

These links address the most important part of building a model; getting accurate network traffic data into it. Without such a link, users are forced to guesstimate network traffic loads. Alternatively, users can print out traffic reports from an analyzer or monitor and manually enter the data into the model, a time-consuming and potentially error-prone process.

There is yet another way to see how various traffic loads will affect a network. Metrix Network Systems, Inc.'s NetMetrix includes a traffic generator feature that produces a traffic load that can be put on a production network. An internetwork monitor measures end-to-end traffic flows based on that load.

But most vendors are sticking with building a link to protocol analyzers. CACI's forthcoming Comnet III and next release of Lannet II.5 will have interfaces to Network General's Expert Sniffer. This link will enable users to automatically create a model using actual traffic loads, device interconnections and topology data.

Links that automatically load real-life traffic data into models are convenient. Analyzers collect the number of packets and average packet size sent from each workstation. However, they do not give minimum and maximum packet sizes or the mean time between transmissions. High-end modeling and simulation packages take the raw data collected by the analyzer and create a statistical representation of traffic that is needed to carry out a simulation.

Without such a direct link, getting traffic data from an analyzer into a model and building a statistical representation of that data is indeed time-consuming and requires a lot of guesswork, says Paul LoBue, senior network engineer at Harris Methodist Health Services in Fort Worth, Texas.

He used CACI's Lannet II.5 and real traffic data from two protocol analyzers to check performance on an existing 56K bit/sec circuit. However, LoBue had to manually enter data from the analyzers into the model because the version of Lannet II.5 he used did not allow automatic data import.

His 2,000-node network links three hospitals and seven satellite buildings in seven counties. It grew from three to 30 servers in just three years. Rapid growth meant adding sites and servers to the network without knowing what the utilization rates were on the connecting wide-area links.

One of LoBue's protocol analyzers measures data flow from the wide-area links to the server, while the other measures traffic from local workstations to the server. The analyzer measuring workstation to server traffic provided the number of packets and average packet size sent from each workstation but did not give minimum and maximum packet sizes or the mean time between transmissions from the workstation to server.

LoBue therefore had to build statistical distribution functions from the analyzer data and make educated guesses about packet sizes and frequency. It took him six simulation runs, changing the size and frequency assumptions each time, to get realistic results.

"The first go-around is never the best," LoBue says. "Getting my model accurate is the biggest part of the puzzle."

The ultimate result was worth the trouble, he says. He discovered his wide-area links were running at 95% capacity and realized he would have to upgrade. Now he's adding higher bandwidth fractional T-1 service.

Presentation capabilities

While it's nice to uncover the same type of information as LoBue, managers must often convey this information in an easy-to-understand format to both technical staff and upper management before gaining a sign-off for a new installation or upgrades. This is where comprehensible presentation capabilities come in handy.

Animation features help to both convey information and clearly demonstrate the complex phases of a network simulation. For instance, with animation, users can see traffic flowing across links as servers receive requests for information from workstations and send responses.

There are two types of animation: playback and run-time. Most packages support playback animation in which a simulation can be stored and played back later. Run-time, or interactive, animation displays network changes as the simulation is running. Its value is in debugging: users can stop a simulation, make changes to the model and continue.

Other presentation capabilities include graphs, topology maps and text files. Most tools can grab a table from the model and print it, create a graph with it or produce a bitmapped graphic from it.

Most packages support the ability to export data to an external publishing or presentation program that has even more presentation capabilities. Some users find this capability especially attractive.

Walter Sobryan, senior communications engineer at New York Life Insurance Co. in New York, sometimes finds it necessary to export data from Comnet II.5 to a statistical analysis program that has much stronger plotting capabilites. Sobryan has used Comnet II.5 for nearly two years to evaluate new applications, equipment and technologies in a growing network, which now includes more than 10,000 personal computers and IBM 3270 terminal users in 250 remote offices.

Sobryan summarizes his performance analyses and recommendations in memos distributed to his applications developers. Those memos include performance plots and comparative graphs to back up his findings.

Picking the right platform

Features that aid in building accu-

(continued on page 36)

What you can do with network modeling and simulation software

- Determine how far you can push the limits of your current network.
- Learn when to upgrade, expand or segment the network.
- Test how new technology, equipment, applications, users or configurations will affect the net's performance.
- Examine predicted traffic loads and decide if priority should be given to critical traffic to make sure it gets through first.
- Build complex network designs and test the traffic and throughput limits for each.
- Analyze given traffic loads to determine when to trade off such things as throughput increases for better end-to-end delay.
- Generate configuration and performance specifications for product procurements.
- Justify budget requests by documenting performance projections with reports and graphics.

Net design and simulation

Company	Product	Product type		Operating system	Predefined network support					Modeling and simulation										Data		Mapping level			Price
										Devices			Links		Traffic			Animation							
		Model/simulate	Design/document	D = DOS M = Macintosh O = OS/2 U = Unix V = VMS W = Windows	AppleTalk	Ethernet	Token ring	FDDI	Other	Processor	Storage	Bridge/router	LAN	WAN	Bursty	Correlated	Application	Playback	Run-time	Import from analyzer	Convert raw to statistical	Geography	Topology	Node	
Advanced System Technologies, Inc. (303) 790-4242	QASE RT/s	✔		M		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔			✔	✔	✔	$12,300
Architecture Technology Corp. (612) 935-2035	Token Ring Cabling System Planner		✔	D			✔																✔		$295
Cable Technology Group, Inc. (617) 969-8552	LAN-D/S		✔	D, M, U, V, W	✔	✔	✔	✔	✔											✔	✔		✔	✔	$950
CACI Products Co. (619) 457-9681	Comnet II.5	✔		O, U, V, W		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	$23,500
	Lannet II.5	✔		D, O, U, V, W		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	$9,500-$15,000
	Network II.5	✔		D, U, V, W						✔	✔	✔	✔				✔	✔		✔	✔	✔	✔	✔	$21,500
Comdisco Systems, Inc. (415) 574-5800	BONeS Designer	✔		U						✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔		✔	✔	$12,000+
	BONeS PlanNet	✔		U		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔			✔	✔		✔	✔	$6,000+
Concord Communications, Inc. (508) 460-4646	Trakker		✔	U		✔														✔	✔		✔	✔	$30,000
EclecTec Software, Inc. (408) 461-2040	NetVantage II	✔		M	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	$995
ISICAD, Inc. (714) 533-8910	Command 5000		✔	U																			✔	✔	$15,000
Make Systems, Inc. (800) 545-6253	Netmaker	✔		U		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	$35,000
Metrix Network Systems, Inc. (603) 888-7000	NetMetrix	✔		U		✔	✔	✔				✔	✔	✔			✔		✔	✔	✔		✔	✔	$1,995 (1)
MIL 3, Inc. (202) 364-8390	Optimized Network Engineering Tools	✔		U		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	$14,000
Network & Communication Technology, Inc. (201) 307-9000	Planet		✔	D	✔	✔	✔	✔	✔														✔	✔	$12,500
Scientific & Engineering Software, Inc. (512) 328-5544	Workbench	✔		U		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	$37,000
University of Michigan Software (313) 936-0435	NetMod 1.1	✔		M	✔	✔	✔	✔				✔	✔	✔			✔						✔		$500

(1) Per module

SOURCE: M/R CONSULTING COMPANY, INC., BELLVUE, WASH.

(continued from page 35)

rate models and presenting simulation results are indeed important criteria in selecting a design and optimization package. However, users must make sure their selected package will run on a hardware platform that is powerful enough to complete simulation runs in a reasonable amount of time.

Complex simulations running on a low-end PC can take hours or even days to complete. Worse yet, when such long-running simulations are done, users can discover that errors made in setting up the model produced flawed results. One way to avoid this problem is to select a package that enables users to build a model on a low-end workstation and then run the simulation on a more powerful workstation or even port it to run in a mainframe environment. The user could then view the simulation results on the low-end workstation. The process can be sped up further by using an object-oriented package to build the model.

MIL 3's OPNET includes a programming feature that enables users to build a model on one Unix platform and move it to a more powerful Unix platform that can quickly run the simulation.

Alternatively, users can select a package that runs on a multitasking operating system such as Unix or OS/2, and run the simulation in background mode while continuing to process other applications. This frees the workstation to perform other tasks while it runs a simulation, but doesn't necessarily mean the simulation will be completed faster.

Another way to speed up the simulation process is to simultaneously run several iterations of the model simultaneously being simulated on different workstations. This option ties up more machines but the results of various simulations will be made available all at once.

There is yet another way to speed up simulations. Ray Trujillo, an engineer at Computer Technology Associates, Inc., says users needing to quickly prototype a network design can employ one tool to build the model. They can then manually transfer the model to another tool running on a more powerful platform.

Trujillo uses AST's QASE RT/s on a Macintosh platform to design models that will help predict when an IBM 3090 mainframe will overload and when to upgrade to a dedicated file server. If it would take too long to complete a simulation on the Macintosh, he says he could print out the QASE RT/s program listings and drawings, and manually enter them into a high-end simulation tool running on a mainframe.

Trujillo says this could save him days or even weeks because he wouldn't have to build the models from scratch using the high-end tool.

The low end

Once a net manager has modeled and simulated a network and decided upon the best network configuration, there are tools that will help map out and document the network, right down to the wiring scheme.

Design and documentation tools have a wide range of capabilities and are increasingly being linked with higher end network design or management programs.

Some, such as ISICAD, Inc.'s Command 5000, have asset-tracking features that document configuration and connectivity information for voice and data nets. Command 5000 has links from its proprietary computer-aided design system to third-party database management systems. It also works with Hewlett-Packard Co.'s OpenView network management system, providing a link to logical management and help desk capabilities.

Wiring design tools help design and track wiring schemes. New standards from the Electronics Industry and Telecommunications Industry associations (568 and 606 standards) provide guidelines for wiring commercial buildings. Wiring design tools are starting to incorporate these standards.

Wiring tools may be specific to certain network types, such as Architecture Technology Corp.'s program for IBM Token-Ring Networks. Others, such as Cable Technology Group, Inc.'s LAN-D/S, create drawings that depict the exact way in which a user laid out a LAN wiring scheme. LAN-D/S runs on most hardware platforms within Autodesk, Inc.'s AutoCAD drawing program.

Another type of design and documentation aid are monitoring packages such as Concord Communications, Inc.'s Trakker. This package collects end-to-end node activity on the network on a user-by-user basis or even by application or protocol used. This information is put into a database that net managers can use for what-if design changes, in effect acting as a low-end simulator.

For most users, closely examining the way in which design and

(continued on page 40)

NETWORK WORLD

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1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
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14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other_____

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt. 3. ☐ Datacom/Telecom Mgmt.
2. ☐ LAN Mgmt. 4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt. 6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)
8. ☐ Consultant (Independent)
9. ☐ Other_____

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs 3. ☐ LANs 5. ☐ None
2. ☐ LANs/ Internetworking 4. ☐ WANs

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 3. ☐ 20 - 49 5. ☐ 2 - 9. 7. ☐ None
2. ☐ 50 - 99 4. ☐ 10 - 19 6. ☐ 1

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope (check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services in the next year.

A Involved	B Plan to Purchase	
		LOCAL-AREA NETWORKS
☐ 01.	☐	Local-Area Networks
☐ 02.	☐	LAN Servers
☐ 03.	☐	LAN Operating Systems Software
☐ 04.	☐	Superservers
☐ 05.	☐	Data Base Servers (Oracle, Sybase, etc).
☐ 06.	☐	Terminal Servers
☐ 07.	☐	LAN Services
☐ 08.	☐	LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐ 09.	☐	Network Test Equipment
☐ 10.	☐	Hubs
☐ 11.	☐	Cables, Connectors, Baluns
☐ 12.	☐	UPS
☐ 13.	☐	Network Adapter Boards
☐ 14.	☐	Peer-to-Peer LANs
☐ 15.	☐	Wireless LANs
☐ 16.	☐	SNMP Network Management
☐ 17.	☐	ATM (Asynchronous Transfer Mode)
		INTERNETWORKING
☐ 18.	☐	Bridges
☐ 19.	☐	Routers
☐ 20.	☐	Gateways
☐ 21.	☐	Bridge/Routers
☐ 22.	☐	Hubs
☐ 23.	☐	Intelligent Hubs
☐ 24.	☐	Communications Servers

A Involved	B Plan to Purchase	
		COMPUTERS/PERIPHERALS
☐ 25.	☐	Micros/PCs
☐ 26.	☐	Minis
☐ 27.	☐	Mainframes
☐ 28.	☐	Pen-Based
☐ 29.	☐	Laptops
☐ 30.	☐	Workstations
☐ 31.	☐	Image Processing Workstations
☐ 32.	☐	Front-End Processors
☐ 33.	☐	Terminals
☐ 34.	☐	Printers
☐ 35.	☐	Cluster Controllers
☐ 36.	☐	Fax Machines
☐ 37.	☐	X-Terminals
		SOFTWARE/APPLICATIONS
☐ 38.	☐	Network Management
☐ 39.	☐	Micro to Mainframe
☐ 40.	☐	Security
☐ 41.	☐	Communication/Terminal Emulation
☐ 42.	☐	Word Processing
☐ 43.	☐	Operating Systems
☐ 44.	☐	Business Applications (Finance/Mfg/HR)
☐ 45.	☐	Applications Development
☐ 46.	☐	Data Base Management
☐ 47.	☐	Spreadsheet
☐ 48.	☐	Groupware
☐ 49.	☐	EDI
☐ 50.	☐	E-Mail
☐ 51.	☐	Windows/Graphical User Interface
☐ 52.	☐	4GL/Development
☐ 53.	☐	Multimedia
☐ 54.	☐	Graphics
☐ 55.	☐	Utilities
		WIDE-AREA NETWORK EQUIPMENT/SERVICES
☐ 56.	☐	Modems (9.6K bps and over)
☐ 57.	☐	Modems (under 9.6K bps)
☐ 58.	☐	T-1
☐ 59.	☐	T-3
☐ 60.	☐	Fractional T-1
☐ 61.	☐	Data Switches
☐ 62.	☐	SMDS
☐ 63.	☐	ATM (Asynchronous Transfer Mode)
☐ 64.	☐	Matrix Switches
☐ 65.	☐	Packet Switches
☐ 66.	☐	Protocol Converters
☐ 67.	☐	Diagnostic/Test Equipment
☐ 68.	☐	DSU/CSUs
☐ 69.	☐	Microwave
☐ 70.	☐	Fax Boards/Modems
☐ 71.	☐	VSAT
☐ 72.	☐	Fiber Optic
☐ 73.	☐	Satellite
☐ 74.	☐	ISDN
☐ 75.	☐	PBXs (over 1000 lines)
☐ 76.	☐	PBXs (under 1000 lines)
☐ 77.	☐	Automatic Call Distributors
☐ 78.	☐	Voice Messaging Systems
☐ 79.	☐	Videoconferencing Systems
☐ 80.	☐	Voice Response/Processing
☐ 81.	☐	Switched Voice
☐ 82.	☐	Dedicated Leased Line
☐ 83.	☐	Switched Data
☐ 84.	☐	Centrex
☐ 85.	☐	E-Mail/On-Line Information
☐ 86.	☐	Image Processing
☐ 87.	☐	Audio Teleconferencing
☐ 88.	☐	Local Services
☐ 89.	☐	WATS MTs
☐ 90.	☐	International
☐ 91.	☐	Virtual Networks
☐ 92.	☐	Frame Relay
☐ 93.	☐	Value Added Services
☐ XX	☐	None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	A LANs	B Workstations/ Nodes
1.	☐ 5,000+	☐
2.	☐ 1,000 - 4,999	☐
3.	☐ 100 - 999	☐
4.	☐ 50 - 99	☐
5.	☐ 10 - 49	☐
6.	☐ 9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES

Present	Planned	
☐	☐ 01.	SNA
☐	☐ 02.	DECNET
☐	☐ 03.	MAP/TOP
☐	☐ 04.	TCP/IP
☐	☐ 05.	DCA (Unisys)
☐	☐ 06.	X.25

Present	Planned	
☐	☐ 07.	NOVELL IPX/SPX
☐	☐ 08.	APPC/APPN/LU 6.2
☐	☐ 09.	NETBIOS
☐	☐ 10.	OSI
☐	☐ 11.	APPLETALK
☐	☐ 12.	OTHER_____

LAN OPERATING SYSTEM

☐	☐ 13.	LOCALTALK (APPLETALK)
☐	☐ 14.	BANYAN (VINES)
☐	☐ 15.	DCA (IRMALAN)
☐	☐ 16.	DCA (10-NET)
☐	☐ 17.	IBM (LAN SERVER)
☐	☐ 18.	IBM (PC LAN PROGRAM)
☐	☐ 19.	MICROSOFT (LAN MANAGER)
☐	☐ 20.	UNGERMANN-BASS (NET/1)
☐	☐ 21.	NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐	☐ 22.	PROTEON (PRONET)
☐	☐ 23.	SITKA (TOPS)
☐	☐ 24.	3COM (3+, 3+OPEN)
☐	☐ 25.	ARTISOFT (LANTASTIC)
☐	☐ 26.	HAYES (LANSTEP)
☐	☐ 27.	DEC (PATHWORKS)
☐	☐ 28.	OTHER_____

LAN ENVIRONMENT

☐	☐ 29.	4M TOKEN RING
☐	☐ 30.	16M TOKEN RING
☐	☐ 31.	ARCNET
☐	☐ 32.	ETHERNET
☐	☐ 33.	STARLAN
☐	☐ 34.	FDDI
☐	☐ 35.	LOCALTALK
☐	☐ 36.	10BASE-T
☐	☐ 37.	OTHER_____

OPERATING SYSTEM

☐	☐ 38.	DOS
☐	☐ 39.	UNIX/XENIX/AIX
☐	☐ 40.	OS/2
☐	☐ 41.	OS/2 2.X
☐	☐ 42.	MVS
☐	☐ 43.	VM
☐	☐ 44.	VMS
☐	☐ 45.	MACINTOSH
☐	☐ 46.	WINDOWS
N/A	☐ 47.	WINDOWS NT
☐	☐ 48.	X WINDOWS
☐	☐ 49.	OTHER_____

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe 4. ☐ Australia
2. ☐ Asia 5. ☐ Middle East
3. ☐ South America 6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER_____	☐	☐	☐	☐

MICROCOMPUTERS (fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A	B	
☐ 1.	☐	$100 million and over
☐ 2.	☐	$50 - $99.9 million
☐ 3.	☐	$25 - $49.9 million
☐ 4.	☐	$20 - $24.9 million
☐ 5.	☐	$10 - $19.9 million
☐ 6.	☐	$5 - $9.9 million
☐ 7.	☐	$1 - $4.9 million
☐ 8.	☐	$500,000 - $999,999
☐ 9.	☐	$499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion 5. ☐ $50 to $99.9 million
2. ☐ $1 to $9.9 billion 6. ☐ $10 to $49.9 million
3. ☐ $500 to $999.9 million 7. ☐ $5 to $9.9 million
4. ☐ $100 to $499.9 million 8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000 4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999 5. ☐ 500 - 999
3. ☐ 2,500 - 4,999 6. ☐ 499 or less

9222

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Who goes there?

Test team finds only a few access control products measure up to user needs.

One of the *Arabian Nights* tales that the genie in The Walt Disney Co.'s new movie *Aladdin* briefly refers to is Ali Baba, who gained access to the riches stored in the Cave of Forty Thieves by uttering the words "Open sesame." Apparently, the thieves didn't realize that several levels of access control would have been more secure than just one.

However, network managers, anxious to secure the wealth of information transmitted over local-area networks, can purchase workstation access control products that provide detailed audit trails and augment user logons, passwords or other access mechanisms required by server network operating systems.

The latest comparative evaluation conducted by the International Computer Security Association for the *Network World*/ International Computer Security Association Network Security Test Series found that no single workstation access control product has all the features considered most desirable by network managers, although a few come close. Fifth Generation Systems, Inc.'s TriSpan and Pyramid Development Corp.'s PC/DACS tied for first place, with scores of 86%. (See the chart on this page for a complete list of product scores and prices.)

To a certain extent, this evaluation bears out the assumption that high price equals high performance. High-scorer TriSpan is pricey at $895 per copy, although PC/DACS, the other high scorer, costs only $249. Users should note that TriSpan did better in the auditing and file access control categories, while PC/DACS outscored TriSpan in regard to access control features.

Access control involves identifying authorized users and limiting which files, applications, devices and LAN segments those users have permission to access. These products employ such methods as user logons and passwords to enforce user privileges.

Three of the products in this evaluation work with the Apple Computer, Inc. Macintosh; the rest run on DOS-based workstations. Also, the majority of products are software-only, although some include optional hardware, such as a firmware board or a smart card and reader.

All of the products can be used on a LAN-attached workstation, and many can be configured to deny specific users access to the LAN. They cannot be configured to run on the server to protect LAN-attached workstations.

The association evaluated a range of different features and functions that are common across access control products. For the purpose of this story, it chose to report the results of major product criteria, such as user access control, auditing capabilities and file access control. Each feature in these categories was given a weight of 10 points.

When considering a workstation access control product, users may also need to consider whether the offering modifies system files. Some products may alter system files, which could impact the node's ability to recover from a failure. In addition, ease of use is another buying factor; some products may be easier to use because they provide menus rather than command-line interfaces.

In addition, some products can protect sensitive information on a workstation screen or in memory when the workstation has been inactive for a certain length of time.

User access control

In today's open-plan offices, locking up every LAN-attached workstation is virtually impossible. Alternately, the workstation can be reasonably secured by removing the floppy-disk drives, sealing the machine with a locking screw and locking it to the desk. But such drastic measures would make most users rebel.

The next best step is to install software that controls which users can access the information in the microcomputer or gain entry to the attached LAN.

The International Computer Security Association evaluated many product features related to user access control, such as the levels of access control allowed, password length, number and variety of password characters allowed, and control of illegal access attempts. In terms of user access control features, PC/DACS scored highest, with 145 points out of 150.

One criterion of access control in this evaluation was the ability to set at least two levels of access control — a user logon and a password — for an administrator or net manager and at least two levels of access control for users. These products can also be configured so that several users utilizing the same workstation can have their own logon and password, as well as access to a different set of files and devices. Ideal products must support at least 10 end users.

Almost all the products tested scored the full 10 points for this feature. Commcrypt, Inc.'s AccessGuard supports only a single-user logon. And while CMG Computer Products' APO supports up to nine user logons, it does not support two access levels. Therefore, both earned scores of zero. Key Concepts, Inc.'s SureKey/2 supports two levels of security but only one user logon, which earned it only five points. Personal Computer Card Corp.'s PCSS received nine points for providing the correct levels of security but only for nine logons.

Another feature of workstation access control products is password length. The association thought that products ideally should enable the network manager to enforce a minimum password length and that 10-character passwords should be possible. Also, the products should support all 256 extended ASCII characters in their passwords.

Many products earned the full 10 points, with only SureKey/2 scoring a zero. AccessGuard, Commcrypt's CryptoLock, PC Guardian's Data Security Plus, TriSpan and Lassen Software, Inc.'s Trusted Access do not allow usage of all 256 ASCII characters, for which two points were deducted. Also, APO received a score of only four points because it does not enforce minimum password length and limits the passwords to only letters and numbers.

Some products' password capabilities were quite sophisticated, as well. For example, Magna's Empower I, Empower II and Empower Remote allow the network manager to set password expiration periods or require passwords to contain upper and lower case characters or special characters. With Data Security Plus and Trusted Access, the net manager can also specify password expiration times.

"The larger the character set used in a password and the longer the password, the less likely the success of a 'brute-force' attack, where the hacker keeps trying combinations of letters and numbers," says David Stang, director of research for the International Computer Security Association.

He also evaluated the ability of the products to show users the most recent time and date they logged on. This feature enables users to help with the corporate task of access control. If the system shows a logon time that is more recent than the actual last logon time, the person can notify the net manager.

Only a handful of products — T.C.P Techmar Computer Products, Inc.'s ComLock, CryptoLock, Empower I, Empower II, Empower Remote, PC/DACS, TriSpan and Trusted Access — earned 10 points for having this capability. In addition, although PCSS did not have this feature, the International Computer Security Association awarded it the full 10 points because its use of smart cards and personal identification numbers considerably

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By ALISON CONLIFFE

Access control products scorecard

Vendor	Product	Access control	Auditing	Disaster recovery	Ease of use	File access control	Disclosure protection	Unauthorized changes	Total	Score (%)	Price
Maximum score		150	90	20	50	70	30	10	420	100	
A.B. Data Sales, Inc.	HardDrive Lockup	98	63	16	40	20	10	2	249	59	$99.95
Certus International Corp.	Certus	70	40	20	15	5	10	10	170	40	$89-$189
CMG Computer Products	APO	18	0	10	10	10	10	0	58	14	$29.95
Commcrypt, Inc.	AccessGuard	81	22	18	20	10	20	10	181	43	$79
	CryptoLock	68	50	20	20	30	0	10	198	47	$129
Fifth Generation Systems, Inc.	Safe	93	80	20	50	58	25	0	326	78	$295
	TriSpan	128	90	20	45	63	15	0	361	86	$895
Fischer International Systems Corp.	Watchdog	98	70	20	40	55	25	10	318	76	$295
	Watchdog Armor	108	80	20	40	55	25	10	338	80	$445-$475
Key Concepts, Inc.	SureKey/2	50	0	10	15	0	15	0	90	21	$100-$325
Lassen Software, Inc.	Trusted Access	66	22	8	22	0	10	0	128	30	$15.25-$880
Magna	Empower I*	84	37	10	25	19	10	0	185	44	$169-$878
	Empower II*	104	61	20	30	53	10	0	278	66	$296-$1,539
	Empower Remote*	104	61	20	40	53	10	0	288	69	$396
PC Dynamics, Inc.	Total Security	88	43	20	45	53	25	10	284	68	$36-$149.95
PC Guardian	Data Security Plus	101	34	20	20	43	15	10	243	58	$224.95-$324.95
Personal Computer Card Corp.	PCSS	103	67	16	25	43	15	10	279	66	$199-$299
Pyramid Development Corp.	PC/DACS	145	80	20	45	40	30	0	360	86	$249
Safetynet, Inc.	StopLight	108	66	20	50	55	25	10	334	80	$89-$295
T.C.P. Techmar Computer Products, inc.	ComLock	103	24	8	28	36	15	2	216	51	$79-$169

* Macintosh product

SOURCE: INTERNATIONAL COMPUTER SECURITY ASSOCIATION, WASHINGTON, D.C.

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Memory/Storage	2MB RAM 80MB HD	8MB RAM 80MB HD	8MB RAM 120MB HD
Pre-installed Operating System	DOS 5.0	OS/2® 2.0	OS/2 2.0
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IBM®

Building a better network

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optimization tools are priced is just as important as scrutinizing the various features.

Money matters

High-end tool vendors package and price their products differently. Some are priced as all-inclusive packages. Others are unbundled into a basic package consisting of the application processing engine and a series of add-on modules.

CACI and MIL 3 include the entire program for a single base price, while Comdisco's BONeS PlanNet is unbundled. Maintenance contracts are usually separate and generally include telephone support, documentation, software updates and training classes.

CACI's Lannet II.5 varies according to platform: $9,500 for DOS, $11,500 for Windows or OS/2, and $15,000 for Unix. First-year maintenance is included; successive years are 10% of the purchase price.

MIL 3's existing OPNET sells for an all inclusive fee of $14,000. The new object-oriented MIL 3 OPNET Analyst will sell for $7,000, while the renamed OPNET Modeler will remain $14,000. MIL 3's annual maintenance cost is $1,500 for OPNET Analyst and $3,000 for OPNET Modeler.

Comdisco's BONeS PlanNet has a basic engine for $6,000 and add-on modules that sell for $1,000 to $3,000 each. A best-buy starter kit for $9,800 provides basic modules most users need: constant and variable traffic generators, two-port bridge and choice of backbone network.

Users examining design and optimization packages for the first time wonder if they are worth the investment. Current users say there is indeed a payback. The ability to model and simulate enables users to redesign networks for peak performance, avoid costly downtime and justify new purchases.

However, these packages have a hidden cost; the time it takes to learn how to use them properly. The high-end tools require network managers to have programming skills or highly trained programmers on staff.

While the newly introduced object-oriented tools require less programming skill, users must still have a good understanding of the physical network, its components and how a change in topology affects performance. Such knowledge is essential in helping to create a good network model.

Users also need a basic knowledge of statistics — such as means, standard deviations and distributions — and must know how to interpret data from a protocol analyzer. For a small shop with a few LANs or a network of fewer than 100 nodes, high-end tools are probably not worth their price or the investment in time spent learning to use them.

Steve Chau, network analyst for Charles Schwab & Co., Inc. in San Francisco, is using Comdisco's PlanNet to overhaul a nationwide network that has grown from 12 LANs to 50 in 18 months.

Chau and other users cite a number of strong reasons to use these types of products. They can help users consolidate and document knowledge of their existing networks into a single software package. That base of information can be embellished by other designers. Furthermore, the information remains with the firm even when designers leave.

Chau and his colleagues also say that the tools' costs are trivial compared to the total investment in network hardware, software and cabling. The tools also enable users to respond more quickly to requests for network services, especially pioneering ones.

Lastly, the tools allow users to design and test network configurations without touching the mission-critical production network and risking downtime.

Ties to management packs

Today, design optimization tools are generally stand-alone programs that can help users design and manage complex internetworks. As such, they are helpful in their own right.

But a key value lies in future integration into an overall network management scheme. Signs of this direction already exist. For instance, some packages can now pull network monitor data and wiring information in from external sources.

Some vendors are thinking of building even more intricate links. Network & Communication Technology, Inc. is considering building a link from its Planet wiring design and documentation tool to Comdisco's BONeS Designer. This would enable users to pull cable connection information into BONeS Designer when building a model.

In the short term, net managers should start learning to use these tools now. Because in the long term, their jobs will depend on making better network decisions.

Cope is president of M/R Consulting Company, Inc., a Bellevue, Wash.-based marketing research and consulting firm specializing in data communications. She plans to publish a detailed report on modeling and simulation and can be reached at (206) 649-0408.

Who goes there?

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lessens the threat of unauthorized users logging on as established users.

Stang's association also considered it important that the products be able to control illegal access attempts by locking the user out of the workstation, with an audit trail stored either in internal battery backup memory or in a protected file. In addition, products should display data about the illegal access attempt on the workstation monitor.

Many products earned the full 10 points. However, APO earned only one point because it does not shut down the system nor does it store an audit trail. After a user-defined number of unsuccessful logon attempts, the product sounds an audible alarm.

A handful of products — Empower I, Empower II, Empower Remote, PCSS and PC Dynamics, Inc.'s Total Security — earned four points for keeping only an audit trail or log of illegal access attempts. SureKey/2 does not keep an audit trail, nor does it display a warning on the screen. But it does lock out the user, for which it earned five points.

Some products will deny access to all attached devices until the workstation has finished booting and the access control program has been executed. Others will allow selective usage of floppy and hard drives and serial and parallel ports. This prevents unauthorized users from booting the workstation from a system disk in the floppy drive, thus bypassing the security software.

ComLock, Empower I, Empower II, Empower Remote, A.B. Data Sales, Inc.'s HardDrive Lockup, PC/DACS, Fifth Generation's Safe, SureKey/2, Total Security, TriSpan and Fischer International's Watchdog Armor earned a full 10 points for having that ability. Certus International Corp.'s Certus, Data Security Plus and Safetynet, Inc.'s StopLight earned partial credit of only five points for not limiting access to the floppy drive.

With StopLight, however, if the user boots from the floppy drive and accesses the network, a StopLight utility program in the network logon script can detect whether the access control product is inactive on the workstation. If not, the user will be automatically logged off.

Hitting the audit trail

The International Computer Security Association also evaluated each product's ability to provide audit trails. TriSpan was the high scorer in this category, receiving all of the possible 90 points.

"Audit trails are the computer equivalent of fingerprints. Without them, we don't know a user has been here," Stang says. But he also cautions users about audit trails. Many of them are so full of detailed information about what users have been doing that a tool that can help sift through it, find the pertinent information and display it may be necessary.

First, the association checked to see which products could provide internally generated and stored audit trails of time stamps for the beginning and end of all the sessions, and to see if the trail included a user authentication index, ID codes and the utility action code used by the net manager or user. An authentication index and ID codes are both means of proving that the user who appears in the audit trail is indeed the correct user.

Many of the products scored a 10. However, APO and SureKey/2 received scores of zero. Because Trusted Access records the logon attempt but not the end of session nor any actions of the user once that person is logged on, it received a score of two.

The ideal access control product should also be able to generate and store audit trails that show program and file usage. All products scored 10 points, except APO, Empower I, SureKey/2 and Trusted Access, which received no points, and AccessGuard, which scored five points for recording only program usage.

Workstation access control products should also automatically encrypt or protect the audit log from erasure or renaming.

"If I can erase the audit trail, it's like removing fingerprints," Stang says. "Without such protection, any intelligent attacker will finish the job by editing or destroying the audit log."

The association found a wide variety in the ways products protect their audit logs.

Certus does not encrypt its log, but instead, stores it in a hidden ASCII file that unauthorized users cannot erase or rename. With HardDrive Lockup and PCSS, access to such files is automatically denied. Fischer International's Watchdog and Watchdog Armor also do not encrypt their audit log files, but rather, set them for read-only access by end users. These products all received the full 10 points.

ComLock, CryptoLock, Safe, StopLight, Total Security, TriSpan and Trusted Access automatically encrypt their audit logs and received 10 points.

File access control

With regard to capabilities that involve access control of specific files, as opposed to the more general features that involve password protection or other user restrictions discussed above, TriSpan scored the highest of all the products, with 63 points out of a possible 70.

Workstation access control products should be able to deny the user the ability to rename, delete or overwrite critical files such as CONFIG.SYS, COMMAND.COM, hidden system files and the security program's executable files. Products received 10 points if they could prevent file renaming or detect if this happened and correct the situation.

All products scored the full 10 points, except for AccessGuard, APO, ComLock, Empower I, SureKey/2 and Trusted Access, which received scores of zero for not having any of these capabilities. In addition, Certus and CryptoLock received partial credit of five points.

Perfection proves elusive

The perfect workstation access control product, boasting every feature the International Computer Security Assocation could think of, does not exist. Nonetheless, this evaluation shows that there are many capable products on the market today.

When shopping for an access control product, undoubtedly some users will want a product that has the most features, regardless of price. Others will be conscious of economics and perhaps will not need the greatest possible security. Those users have a wide variety of products from which to choose.

Conliffe is an associate features editor at Network World.

The International Computer Security Association conducted this test as part of the *Network World* and the association's Network Security Test Series. The association's mission is to help personal computer and local-area network users improve the security of their information systems, reduce the threat of computer viruses and ensure the integrity of their information resources.

The findings in this article were based on a comprehensive 60-plus page report on microcomputer access control products. It contains the results published in this article, as well as additional findings and background information on the tested products.

For more information, call the association's Virus Research Center at (202) 364-8252 or fax it at (202) 364-1320. The group can also be reached through its bulletin board system at (202) 364-1304.

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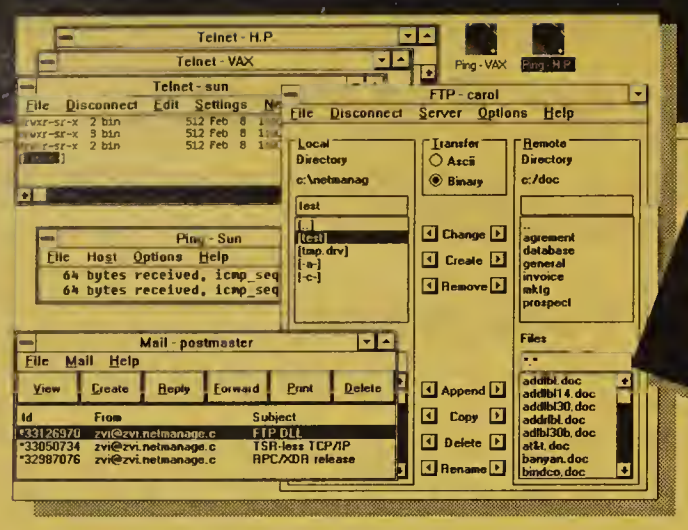

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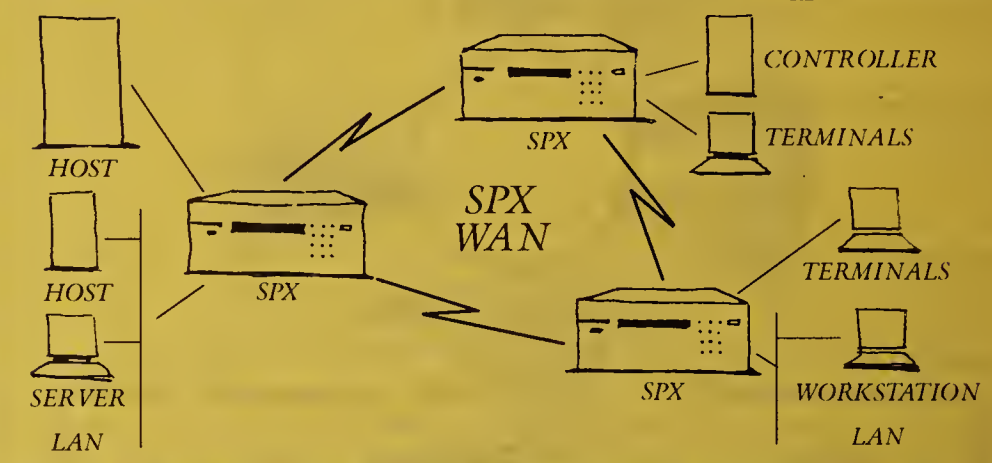

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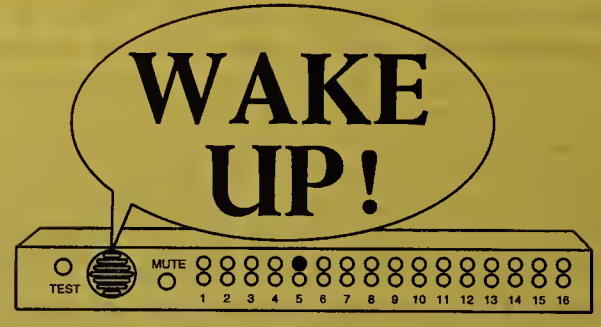

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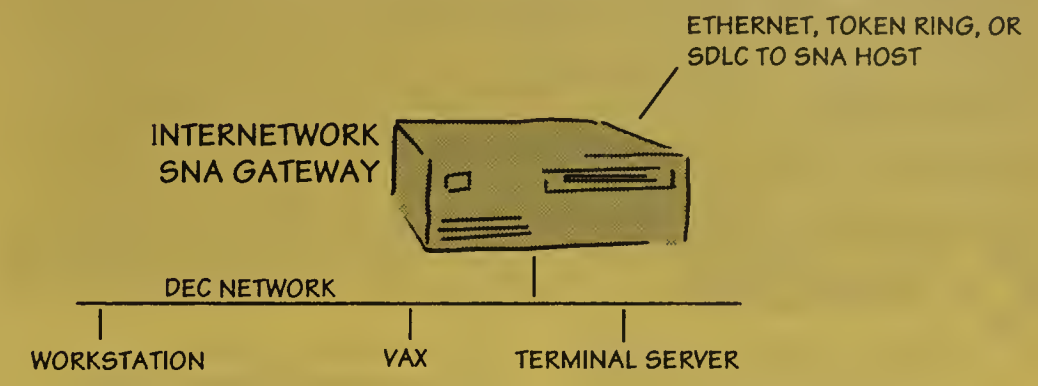

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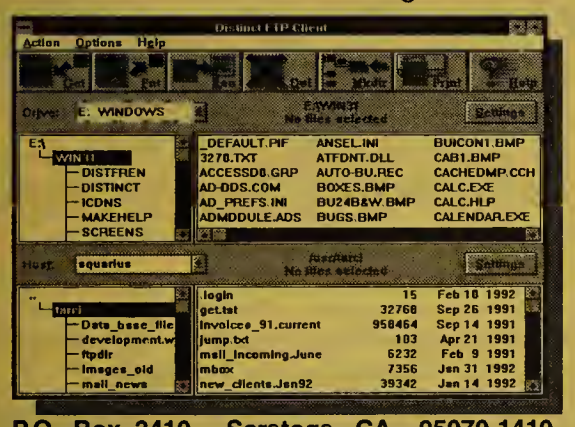

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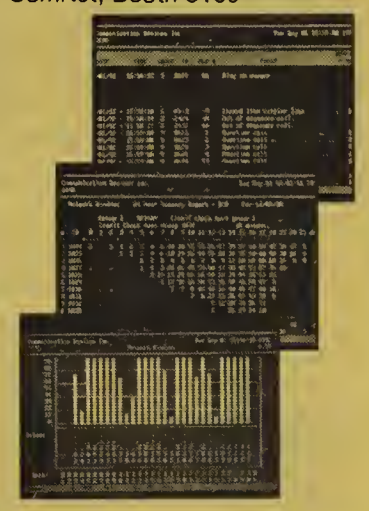

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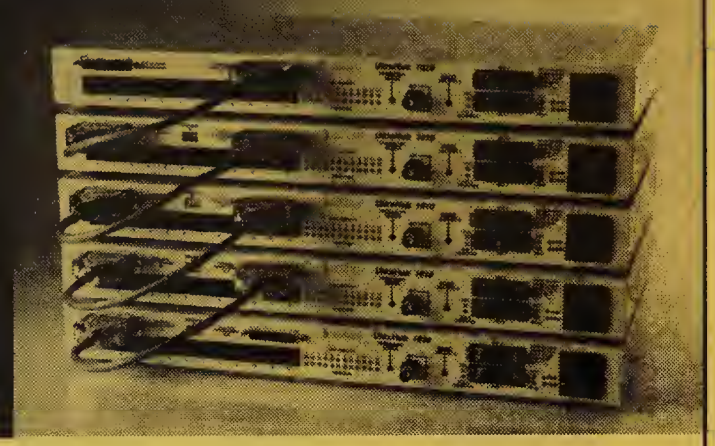

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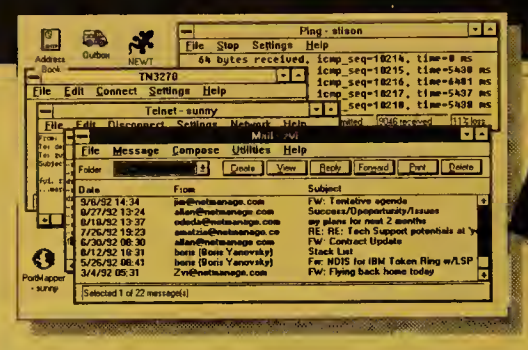

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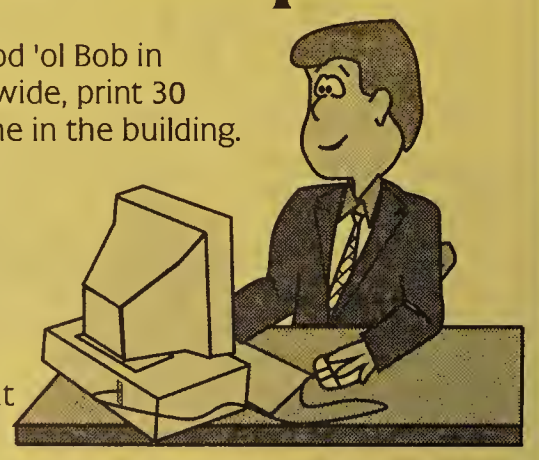

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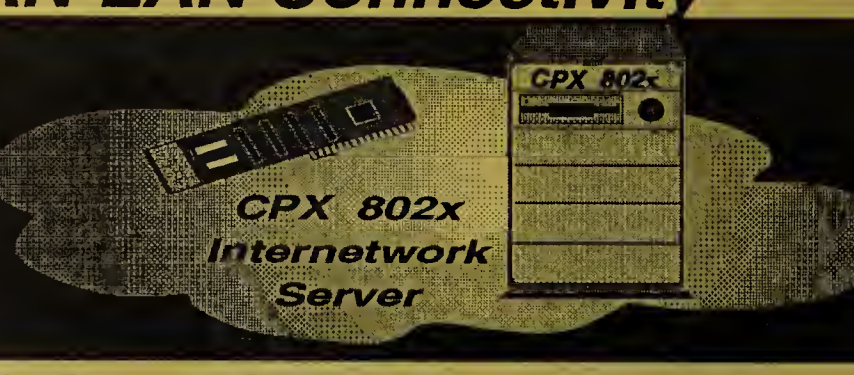

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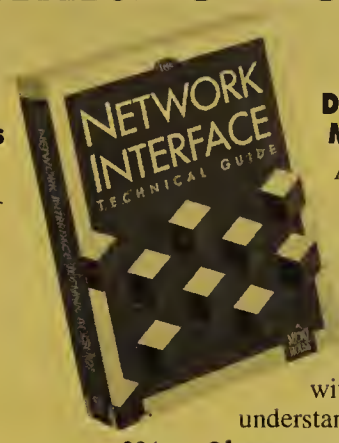

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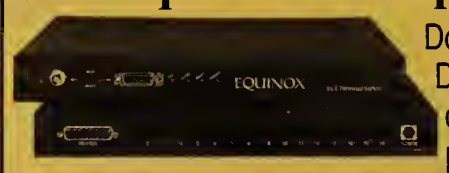

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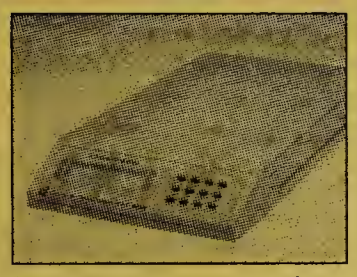

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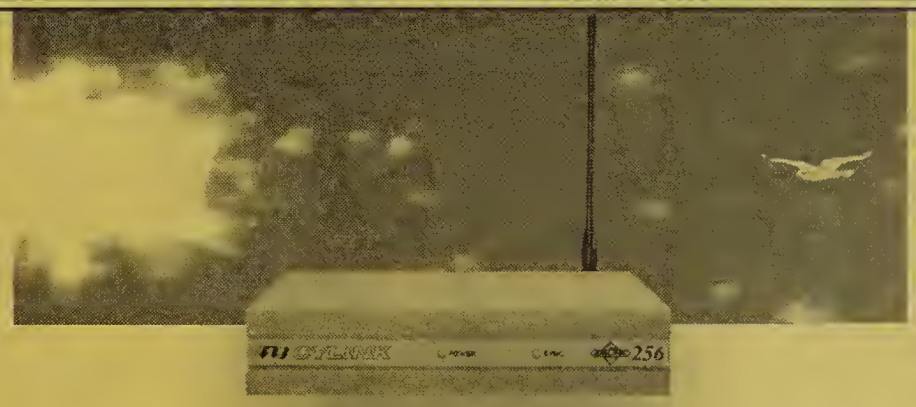

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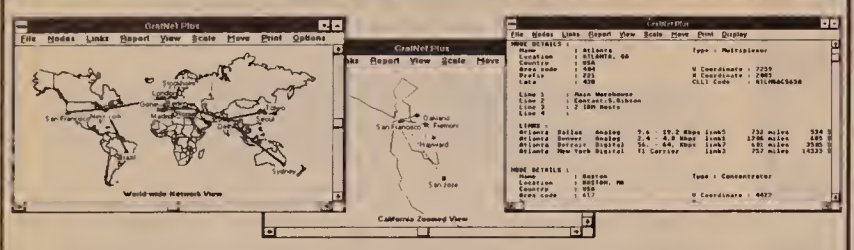

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DEC plans make-over

continued from page 1

Corp.'s LAN Manager — Pathworks is based on LAN Manager — Pathworks is present in only 4% of sites with personal computers attached to local-area networks, according to Business Research Group of Newton, Mass.

Pathworks 5.0 is intended to increase that percentage.

"Pathworks is an old architecture," said Ron Kuhn, network manager at Upjohn Co. in Kalamazoo, Mich. "5.0 is a major overhaul to bring it more up-to-date."

Katrina Holman, DEC group manager of PC integration marketing, confirmed that DEC will roll out the next generation of Pathworks this year, noting that the firm has not committed to a time frame for its release. However, Pathworks users and consultants expect it to emerge in mid-1993.

Pathworks 5.0 will feature improved CPU utilization, so it will consume less processing cycles for tasks such as file transfer and electronic mail, and include better file system performance.

Today, Pathworks on a VMS server supports the VMS file system and emulates the DOS file system, which are accessed through separate command structures, according to Kuhn.

The file system in Pathworks 5.0 will merge the DOS and VMS file systems so that users, based on the file systems' performance, can access the file system of their choice through a consistent command structure, he said.

The new LAN operating system will also be tuned for symmetric multiprocessing servers, sources said, so multiple tasks can be executed on a single-server platform.

Additionally, Pathworks 5.0 will support multithreading capabilities, which means that Pathworks clients can issue transactions to multiple Pathworks servers simultaneously, according to sources.

Pathworks 5.0 will also include a feature that allows client workstations to access multiple protocol stacks on the server, according to Kuhn. The workstations can call on the server to load DECnet, Transmission Control Protocol/Internet Protocol, IBM's Network Basic I/O System Extended User Interface or Novell's Internetwork Packet Exchange (IPX) protocol stacks in order to communicate with other servers or hosts.

Finally, Pathworks 5.0 will comply with LAN Manager 2.2, the latest release of the Microsoft network operating system.

Version 2.2 includes features such as the ability to administer and manage servers from a local or remote client workstation; the ability to allow any DOS or Windows workstation to be designated as a print server; and support for the Data Link Control protocol for better integration with IBM environments.

Holman confirmed that many of these features will be present in Pathworks 5.0.

The new NetWare version of Pathworks, which will be demonstrated next week at NetWorld 93 Boston, was referred to as Pathworks for OpenVMS/NetWare by DEC officials at a recent user symposium.

Observers expect that Pathworks for OpenVMS/NetWare will allow DOS client users to access NetWare file and print services on a VAX or Alpha server via IPX and the NetWare Core Protocol, and applications from other enterprisewide systems via DECnet or TCP/IP. The product is scheduled to ship in the second quarter.

Battle brewing over databases

continued from page 25

parent two-phase commit capability that people are actually using today."

Sybase countered Ellison's claims by maintaining that only 5% of its customers require the tight consistency of updates provided through two-phase commit. In addition, Sybase said most of its customers wanted to avoid a scenario where any single network failure could stop database transactions from being completed.

"The replication model offers a level of fault tolerance that two-phase commit just can't provide but also allows near-synchronous updates — sometimes within milliseconds of each other — to provide timely access to current data," said Teri Palanca, group manager of market analysis at Sybase.

Even Ellison concurs on the long-term value of providing replication.

"In the case of network failures, replication is very important because it allows data to be duplicated automatically throughout the system, giving local sites access to their own data," he said. "So having access to data locally through replication is both a reliability and a performance optimization."

Ellison said Oracle would offer expanded replication capabilities — beyond Version 7's distributed snapshots facility that allows database tables to be replicated over the network — in a new release next year.

Scites: Facing future headfirst

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To Scites, business process redesign is not a fad but rather something that will be here forever, helping companies be more competitive out of necessity.

"You fundamentally must change your business," Scites said. "And you must do it on an ongoing basis so that you have restructured the work. What you want to do is gain a lot of power out of adding just a few people."

Group collaboration tools such as Lotus Development Corp.'s Notes will play a big role in business process redesign, Scites said. However, she does not see group collaboration or any other communications technology being used as a substitute for good old-fashioned human contact. "I think people need people," she said.

Furthermore, group collaboration adds to the communications stimuli that require a response. "We receive paper, we receive fax messages and reports, we have meetings; now we have things like E-mail and Notes," Scites said. One of her staffers recently figured out he could spend 35 hours in any given day responding to all these stimuli.

She also thinks that team building is going to continue to play a role in business process redesign and that end-user involvement is essential, even though many fear it could mean the end of their jobs. "Sure, it's scary," she said. "Everybody needs to lock arms; if we're shaking, we'll all shake together. And if we're going to be scared, we can see the fear in each others' eyes."

In fact, end users will continue to be involved in business process redesign. Scites believes that new tools, some of which are now in development and some of which are on the market today, will make it possible for end users to program and design their own screens.

According to Scites, the massive effort involved in retraining both end users and technical staff, which seems to accompany every business process redesign project, will lessen in the future. Information systems (IS) departments will eventually reach a point, perhaps only two or three years in the future, where the staff companies hire will be already well trained for their roles.

"What we need are people who have a creative bent and can understand the complications of navigating through many hardware devices and many levels of software," she said. But for now, "Every company that goes through reengineering will be faced with this [retraining issue]."

Scites was lucky to have a mandate from upper management for the changes she's made. Unfortunately, she doesn't see much success in the future for companies where business process redesign is driven solely by the IS department, primarily because it's too difficult for them to win the support of upper management.

"It's tough if it's an IS person trying to drive the change. It's much better, as it is in my case, [with] business and technical [people] driving the change," she said. In a lot of companies, top management just can't understand the concept, she added, and therefore, won't support it.

In addition, top managers have been very successful running businesses with a hierarchical organizational structure, so communications technologies that flatten the structure of the company threaten them.

> "Everybody needs to lock arms; if we're shaking, we'll all shake together," Scites said.
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Like many network gurus, Scites predicts that distributed environments will soon become so inexpensive that users will be compelled to migrate to them. Companies will no longer be able to "justify spending $100,000 per MIP on a mainframe," she said. "You'll see migration, over the next three to five to eight years, of people going to alternate hardware devices to handle their applications and their databases." Having the same functionality as a mainframe at a fraction of the cost will be irresistible.

Finally, Scites sees object-oriented programming as a technology that will revolutionize network application development. Object-oriented programming "will allow us to program faster and better than we can even dream of now," she said. "It will reduce our application development expense; I don't even know what the percentage will be, but it will shock us."

By promising a 24-month payback on her company's $6.5 million investment in the equipment used in its business process redesign, Scites displayed a degree of courage that serves as an inspiration to other IS executives. Courage, determination and a personal vision of the future have made Scites a leader among users.

IBM unit, EDS announce deals

continued from page 2

and chief financial officer at the firm.

Under the agreement, the largest for ISSC, the IBM unit will run McDonnell Douglas' entire IS infrastructure, including its data center, personal computer networks and voice networks. It will also take over operational responsibility for the firm's fiscal, scientific, manufacturing production and engineering systems.

> Under the agreement, the IBM unit will run McDonnell Douglas' entire IS infrastructure.
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These services were previously handled by McDonnell Douglas Aerospace Information Services (MDAIS), a McDonnell Douglas subsidiary located here. Under terms of the agreement, ISSC or one of its business partners will offer jobs to the 1,450 MDAIS employees affected by the move. The IBM spokesman said the MDAIS employees will be offered equal or better job packages with ISSC, but he declined to estimate how many employees were expected to accept the offers.

In addition, the agreement calls for ISSC to lease the 74-acre facility that currently houses MDAIS' St. Louis computer center.

Bethlehem follows star

Under Bethlehem Steel's agreement, EDS will take over the management of a range of networks and systems from the plant floor to the firm's mainframe computers.

The deal includes five Bethlehem Steel plants in the U.S. and its corporate headquarters. According to Henry Von Spreckelsen, manager of corporate communications at Bethlehem Steel, the move to off-load its processing and communications stemmed from an initiative to revitalize the company and improve customer responsiveness.

He said the firm expects to save millions of dollars by outsourcing but added that cutting costs was not the driving factor in its decision. EDS will spend the next six months evaluating Bethlehem Steel's network needs and developing a proposal.

Senior Editor Anita Taff contributed to this story.

Card strengthens net management

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access memory and read-only memory, according to Jim Johnson, vice-president of Intel's branded products group in Santa Clara, Calif. The memory acts like RAM while the machine is on but can retain data like ROM when the machine is turned off.

The FlashWorks utility set used with the flash memory consists of four components designed to help administrators manage their Novell, Inc. NetWare and Microsoft Corp. LAN Manager-based PCs from a central console.

When the adapter is loaded into a PC and the machine is turned on, the FlashStart component of the utility automatically searches for a server, then downloads the appropriate NetWare drivers and configuration files onto the PC hard disk. FlashUpdate automatically keeps the users' FlashC card up-to-date with the latest driver.

For diskless workstations, using the new boards would provide for storage of the appropriate NetWare and LAN Manager software and save administrators from having to change jumper settings or adding a programmable ROM to enable the devices to boot from a remote server.

Finally, the FlashView utility collects inventory data. It automatically scans the PC's hardware and software configuration, and stores the information. Once stored, Intel's server-based management application, LANDesk Manager, can be used to collect the information for centralized administration.

"The function of flash software is to put manageability on to the adapter itself," Johnson said.

Although today Intel's LANDesk Manager is the only package that can read flash-resident information, the utilities will ultimately comply with the emerging Desktop Management Task Force specification, which will enable the information to be collected by a variety of network management products.

The EtherExpress 16C adapter and LANDesk Management software are both available now for $189 and $995, respectively. The EtherExpress FlashC adapter will be available next month for $199.

Novell gives Unix shot in arm

continued from page 1

Krick, a senior analyst at Datapro Information Services Group, a Delran, N.J., consulting firm.

Although the long-languishing Unix market is still fragmented today — most versions rendered incompatible by vendor-specific enhancements — the truly 32-bit, multitasking, secure operating system represents a growth opportunity to Novell.

According to one Novell executive, some $50 billion worth of mainframe and minicomputer systems are poised to be downsized to Unix networks.

Novell's one major hurdle would be getting all the Unix players singing the same tune, but it has a proven track record in NetWare for bringing vendors together. With the industry's backing, the vendor could jump-start Unix by rolling out tightly integrated Unix/NetWare offerings at a time when users are looking for more powerful server options.

"This is the shot in the arm that Unix desperately needs," said Charlie Federman, a managing director at Broadview Associates, L.P., a Fort Lee, N.J., mergers and acquisitions firm.

What Novell would get in the acquisition of USL is an $80 million organization responsible for furthering the development of Unix and the Tuxedo transaction processing monitor. USL was formed in 1991 when AT&T spun off its Unix Software Operation unit and sold off 23% of the unit to 12 investors, including Novell, which owns 5%.

One of USL's charters was to add to Unix's multiprocessing functions more security, a user-friendly interface and better administrative features, all of which are now bundled into Unix System V Release (SVR) 4.2.

To ensure that Unix works in network computing environments, USL and Novell also formed in December 1991 a company called Univel to integrate Novell technology into SVR4.2. The end product is called UnixWare.

Novell expects its planned acquisition of USL to go through during the first quarter of 1993. USL would become a wholly owned subsidiary of Novell.

Gift for users

Arun Taneja, vice-president of marketing for Univel in San Jose, Calif., said Novell's planned acquisition of USL is a clear indication that Novell is committed to Unix, something users have previously questioned.

"The full weight of Novell is now behind Unix," Taneja said. "That should make Novell's commitment crystal clear."

Although Novell has enhanced its product line to support Unix and the closely linked Transmission Control Protocol/Internet Protocol over the past few years, analysts said the USL acquisition would give it freedom to further integrate Unix and NetWare.

"I think we might see Novell working to build the NetWare Requester or an IPX stack right into Unix," said Paul Johnson, a vice-president at The First Boston Corp., a brokerage firm in New York. "That would make it a lot easier to integrate Unix servers into Novell environments right out of the box."

Greg Scott, computing services manager for the College of Business at Oregon State University in Corvallis, said Oregon State has 14 NetWare servers and is looking to bring in some Unix machines as high-speed servers.

> "This is the shot in the arm that Unix desperately needs," Charlie Federman said.
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"I see the tighter integration of NetWare and Unix as a natural evolution for Novell and for us," Scott said. "Whereas NetWare is so clean and Unix is [more difficult to use but features] more raw computing power, I think Novell could do Unix some good."

There isn't a downside to the Novell-USL deal, said Steve Stoneman, who is manager of local-area network system support for Martin Marietta Technical Services, Inc. on a contract with the Environmetal Protection Agency in Research Triangle Park, N.C.

"It should ease our integration efforts in the future," he said.

Eliminating confusion

The deal could also help users by eliminating some of the confusion in the Unix market caused by multiple incompatible versions of the software, Broadview Associates' Federman said.

"Novell has been successful as an open systems vendor in giving other vendors access to [application program interfaces] for NetWare," Federman said. Novell is well positioned to do the same thing with Unix, he added.

Richard Finkelstein, president of Performance Computing, Inc., a consultancy in Chicago, said "Novell will make Unix more of a mass-market item. This has got to make Microsoft nervous."

Microsoft is currently in a position to persuade application developers to build to Windows NT rather than to multiple versions of Unix, Federman said. But if Novell can get Unix vendors to rally around a single version of Unix, Microsoft's argument will suffer.

The message being sent from Novell, however, is not a challenge at the desktop so much as one at the server, according to Wayne Kernochan, director of commercial systems research at Aberdeen Group, Inc., a market research firm in Boston.

Novell is looking to position itself to support emerging Unix-based network management specifications from Open Software Foundation, Inc. and Unix International, Inc., he said.

Others said Novell may also gain an edge in markets that Microsoft has yet to tackle, such as on-line transaction processing (OLTP). Given that USL markets Tuxedo, Novell could be well positioned to integrate that product with NetWare for a LAN-based OLTP solution, said Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass.

Senior Editor Wayne Eckerson contributed to this article.

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